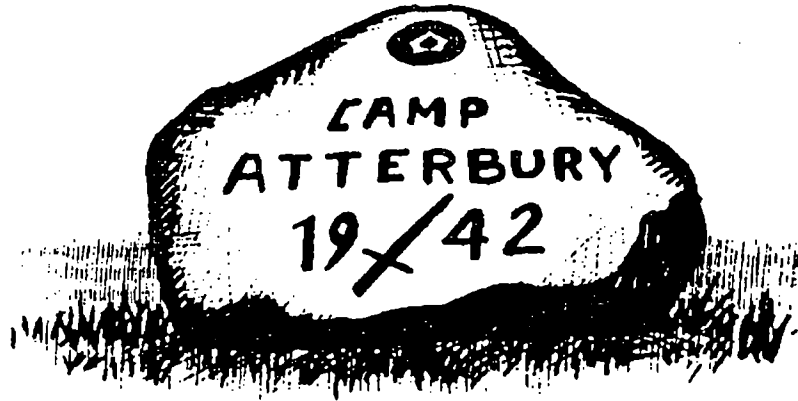

FINAL

CWM SITE INVESTIGATION REPORT

EPA Region 5 Records Ctr.



375110



ATTERBURY RESERVE FORCES TRAINING AREA
EDINBURGH, INDIANA

Prepared For:

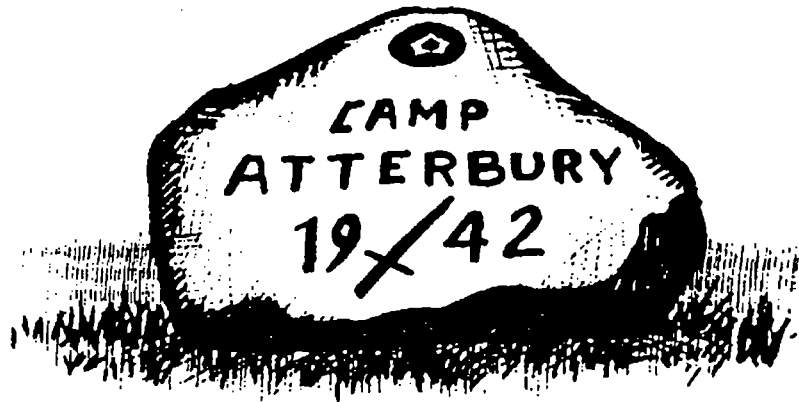
Military Department of Indiana

July 1998



MONTGOMERY WATSON

FINAL
CWM SITE INVESTIGATION REPORT



ATTERBURY RESERVE FORCES TRAINING AREA
EDINBURGH, INDIANA

Contract No. DAHA90-94-D-0013
Delivery Order No. 537
Montgomery Watson File No. 1257033.37010101

Prepared For:

Military Department of Indiana

Prepared By:

Montgomery Watson
Novi, Michigan

July 1998

EXECUTIVE SUMMARY

The Military Department of Indiana (MDI) contracted Montgomery Watson to perform a limited site investigation (SI) at the suspected Chemical Warfare Material (CWM) burn area at Atterbury Reserve Forces Training Area (Camp Atterbury) located in Edinburgh, Indiana. The work was performed under Contract No. DAHA90-94-D-0013, Delivery Order No. 537.

In the late 1960's, an unknown liquid was burned at the CWM burn area. Based on the description of the substance from the individuals involved, the substance could not be positively identified. MDI chose to assume a worst case, that the substance was blister agent. The Army Technical Escort Team from Aberdeen Proving Ground, Maryland, conducted an investigation in 1993 to include a records check back to the 1930's. There is no record of blister agent being shipped to Camp Atterbury. The objective of the limited SI was to determine if mustard agent or its breakdown products were present at the CWM burn area. The limited SI included soil and sediment sampling. Ten soil samples, one duplicate sample, and one matrix spike/matrix spike duplicate (MS/MSD) sample were collected at the site. In addition, three sediment samples, one duplicate sample, and one MS/MSD sample were collected from the stream located at the site. The samples were sent for analysis to GP Environmental Services, Inc., a laboratory certified by the United States Army Corps of Engineers.

None of the samples collected contained concentrations of mustard agent or any of its breakdown products. Therefore, based on the results of this investigation, Montgomery Watson recommends no further action at the site.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	ES-1
1.0 INTRODUCTION	1
2.0 FACILITY BACKGROUND	3
2.1 HISTORY AND CURRENT USE	3
2.2 SITE DESCRIPTION	4
2.3 PREVIOUS INVESTIGATIONS	4
3.0 ENVIRONMENTAL SETTING	7
3.1 METEOROLOGY	7
3.2 GEOLOGY	7
3.3 SOILS	8
3.4 SURFACE WATER HYDROLOGY	8
3.5 HYDROGEOLOGY	9
3.6 TOPOGRAPHY	10
4.0 FIELD PROGRAM	11
4.1 DEVIATIONS FROM THE WORK PLAN	11
4.2 FIELD SCREENING ACTIVITIES	11
4.3 CONFIRMATION SAMPLING ACTIVITIES	11
4.4 INVESTIGATION-DERIVED WASTE MANAGEMENT	13
5.0 INVESTIGATIVE FINDINGS	14
5.1 FIELD SCREENING RESULTS	14
5.2 CONFIRMATION SAMPLING RESULTS	14
6.0 ARARs	15
6.1 ARARS FOR SOILS	15
6.1.1 Action-Specific ARARs	15
6.1.2 Chemical-Specific ARARs	15
6.1.3 Location-Specific ARARs	15
6.2 ARARS FOR SEDIMENT	15
6.1.1 Action-Specific ARARs	15
6.1.2 Chemical-Specific ARARs	16
6.1.3 Location-Specific ARARs	16
7.0 CONCLUSIONS	17
8.0 RECOMMENDATIONS	18
9.0 REFERENCES	19

TABLE OF CONTENTS (CONTINUED)

LIST OF FIGURES

Figure 1	Facility Location Map.....	2
Figure 2	Site Location Map.....	5
Figure 3	Site Features/Sampling Locations Map	12

LIST OF APPENDICIES

Appendix A	Screening Results
Appendix B	Boring Logs
Appendix C	Chain of Custody Forms
Appendix D	Analytical Results and Quality Assurance/Quality Control Results

J:\jobs\033\37\SI Report\CWMTOC.doc

LIST OF ACRONYMS

ARARs	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
CWM	Chemical Warfare Materials
DO	delivery order
°F	degrees Fahrenheit
FORSCOM	U.S. Army Forces Command
ft	feet
gpm	gallons per minute
HSP	Health and Safety Plan
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural resources
IDW	investigation-derived waste
IGS	Indiana Geological Survey
MACOM	Major Command
MDI	Military Department of Indiana
MDLs	method detection limits
MINICAMS™	modified gas chromatograph
MS/MSD	matrix spike/matrix spike duplicate
NGB	National Guard Bureau
PA	Preliminary Assessment
PPE	personal protective equipment
QA/QC	quality assurance/quality control
QAPjP	Quality Assurance Project Plan
SAP	Sampling and Analysis Plan
SI	Site Investigation
SOP	standard operating procedure
USAEHA	United States Army Environmental Hygiene Agency
USDA SCS	United States Department of Agriculture Soil Conservation Service

J:\jobs\033\37\SI Report\siacro.doc

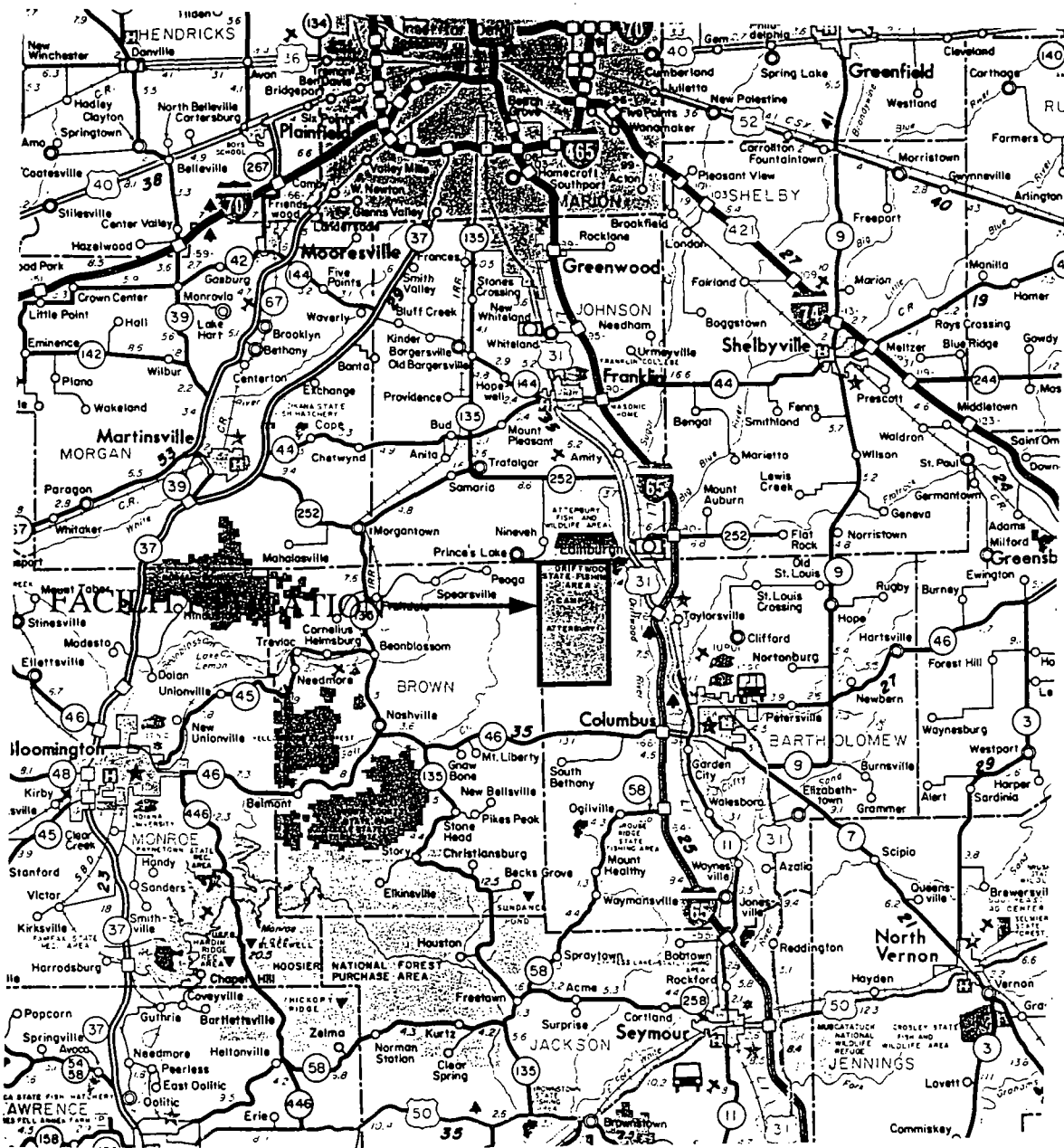
1.0 INTRODUCTION

The Military Department of Indiana (MDI) contracted Montgomery Watson to perform a limited site investigation (SI) at the Atterbury Reserve Forces Training Area (Camp Atterbury) Chemical Warfare Material (CWM) burn area located in Edinburgh, Indiana. This work is being performed under Contract No. DAHA90-94-D-0013, Delivery Order (DO) No. 537.

Camp Atterbury is located in south central Indiana, approximately 35 miles south-southeast of Indianapolis, Indiana (Figure 1). The property consists of approximately 33,000 acres and lies in Bartholomew, Brown, and Johnson counties. Montgomery Watson prepared a Field Investigation Work Plan for this project, which included the project management approach, a Sampling and Analysis Plan (SAP), a Site-Specific Health and Safety Plan (HSP), and a Quality Assurance Project Plan (QAPjP). Both MDI and the Indiana Department of Environmental Management (IDEM) reviewed each plan. The purpose of the limited SI field activities was to determine if the soils and sediments in the CWM burn area at Camp Atterbury have been impacted by mustard agent, a CWM used in World War I. This report includes a description of the field investigation activities, a summary of the findings associated with these activities, and recommendations for future site activities.

The following text outlines the organization of the report.

- Section 2 provides a history of the facility and a description of the site.
- Section 3 presents the environmental setting of the facility which includes a discussion of site geology, meteorology, hydrology (groundwater and surface water), and topography.
- The field program is presented in Section 4.
- Section 5 presents the investigative findings.
- Section 6 presents a discussion on applicable or relevant and appropriate requirements (ARARs).
- Sections 7 presents conclusions.
- Section 8 provides recommendations for future activities at the site.



FACILITY LOCATION

NOTES:

BASE MAP DEVELOPED FROM
1995-1996 INDIANA DEPARTMENT OF
TRANSPORTATION MAP.

0 13 26
SCALE IN MILES



MILITARY DEPARTMENT OF INDIANA
CAMP ATTERBURY CWM SITE INVESTIGATION
EDINBURGH, INDIANA

FACILITY LOCATION MAP

FIGURE 1



MONTGOMERY WATSON

2.0 FACILITY BACKGROUND

2.1 HISTORY AND CURRENT USE

Camp Atterbury covers approximately 33,000 acres in Johnson, Brown, and Bartholomew counties in south-central Indiana (United States Army Environmental Hygiene Agency [USAEHA], 1981). Camp Atterbury was established in 1942 as a training area for the United States Army, and is currently used as a site for military training exercises. The property north of Hospital Road, now the Atterbury State Fish and Wildlife Area, was part of Camp Atterbury until 1967.

Camp Atterbury is used as a weekend and annual training site for the National Guard. It provides both housing and training for units as large as a brigade with its normal division and corps-supporting elements. Several ranges for a variety of weapons, including aircraft bombing, artillery, flame throwers, grenades, helicopter gunnery, mortars, machine guns, rifles, and pistols, are located at the facility (Weston, 1993). A gunnery range used by the Army National Guard is also located at the camp (United States Department of Agriculture Soil Conservation Service [USDA SCS], 1990).

Between 1969 and 1984, Camp Atterbury was operated by the MDI under the National Guard Bureau (NGB), and was a subpost of Fort Benjamin Harrison. In October 1984, Camp Atterbury became a separate, stand-alone installation under the U.S. Army Forces Command (FORSCOM) with the NGB remaining the peacetime Major Command (MACOM) (Weston, 1993).

Camp Atterbury is located approximately 35 miles south-southeast of Indianapolis, west of U.S. 31 and Interstate 65, and north of State Route 46 (Figure 1). Although most of the facility is in western Bartholomew County, the western edge of the facility is in Brown County and the northern portion is in Johnson County. Approximately 45 percent of the Camp Atterbury property is forested (primarily west and south) and approximately 45 percent supports native grasses and weeds (USDA SCS, 1990).

Population centers close to Camp Atterbury are generally located to the north, east, or south in Johnson and Bartholomew Counties; the rugged terrain in western Bartholomew County and eastern Brown County has limited access and settlement. Surrounding population centers include the Prince's Lake and Cordry Lake areas to the west, Edinburgh to the northeast, Taylorsville to the east, and Columbus to the southeast.

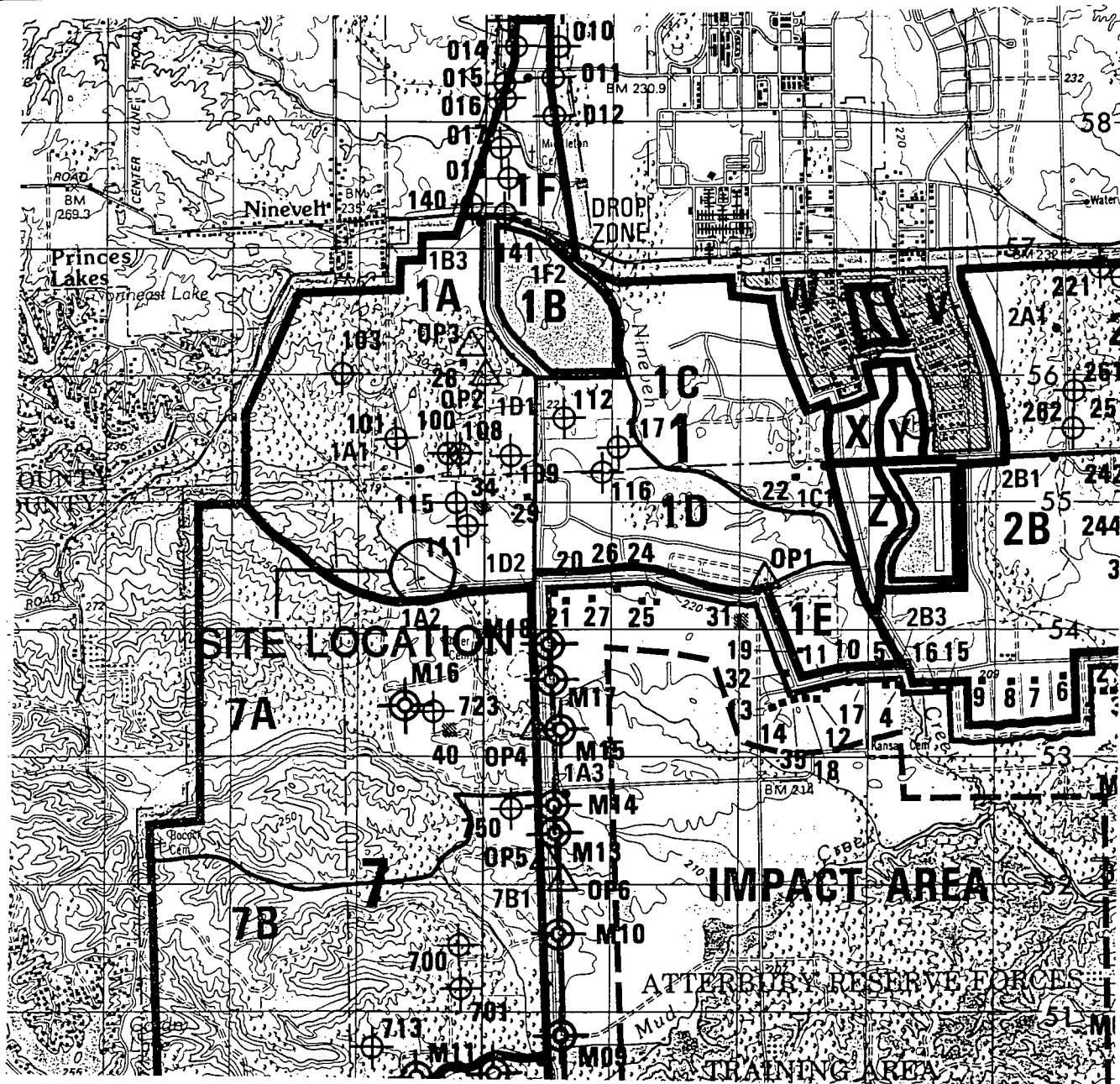
Land use in Johnson County is increasingly moving away from farming toward more urban uses as Indianapolis and its suburbs expand outward (USDA SCS, 1979). Farming is one of the major businesses in Bartholomew County (USDA SCS, 1992). Because of the generally steep slopes, most of Brown County is not suitable for cultivated crops and remains forested.

2.2 SITE DESCRIPTION

The CWM burn area is approximately one and a half acres in size and is located northwest of the Impact Area (Figure 2). Sometime between 1968 and 1970, approximately 25 to 30 gallons of an unknown material were disposed at the site. The material was poured into buckets containing gasoline and ignited. The material was assumed to be mustard agent, a CWM used extensively in World War I (Willis, 1991).

2.3 PREVIOUS INVESTIGATIONS

The following section presents a summary of the previous investigations conducted at Camp Atterbury. In 1993, Weston completed a Preliminary Assessment (PA) for Camp Atterbury. The PA report identified areas of potential concern at Camp Atterbury. Due to the limited availability of site-specific hydrogeological information, the PA also recommended that "a comprehensive hydrogeological study be performed which would include groundwater velocity and direction determination, vertical gradients, and recharge and discharge rates" (Weston, 1993). IDEM concurred with this recommendation in their comment letter to Mr. John Orr of MDI dated July 18, 1995. In this same letter, IDEM expressed concern that the private wells along Wallace Road (part of the eastern property boundary of Camp Atterbury) may be jeopardized by impacted groundwater flowing from Camp Atterbury to the south-southeast (IDEM, 1995). The PA did not



NOTE:
 MAP DEVELOPED FROM 1983
 DEFENSE MAPPING AGENCY
 ATTERBURY RESERVE FORCES
 TRAINING AREA MILITARY
 INSTALLATION MAP.

MILITARY DEPARTMENT OF INDIANA
 CAMP ATTERBURY CWM SITE INVESTIGATION
 EDINBURGH, INDIANA

SITE LOCATION MAP

FIGURE 2



MONTGOMERY WATSON

include any sampling activities. The PA recommended that sampling be conducted at the areas of concern to assess the extent of suspected soil and groundwater contamination.

Based on the recommendations in the PA report, Montgomery Watson performed an SI which included soil and groundwater sampling at the areas of concern identified in the PA. None of the samples collected during the SI contained concentrations of contaminants that exceeded IDEM Tier II Nonresidential Cleanup Criteria. Montgomery Watson also performed hydrogeologic testing to determine the hydrogeologic characteristics of the study area. Montgomery Watson recommended that no further action be taken at the areas of concern.

The CWM burn area was not identified as an area of concern in previous investigations. MDI contracted Montgomery Watson to conduct a limited SI at the CWM burn area.

3.0 ENVIRONMENTAL SETTING

3.1 METEOROLOGY

The climate in the vicinity of Camp Atterbury is influenced by its midcontinental setting, which results in cold winters and hot summers. It is located on the edge of the area influenced by the Great Lakes. Generally, the weather is variable, changing frequently with the passage of cool, Canadian air masses from the north, and warm, humid, tropical air masses from the south. Based on climatic data collected between 1951 and 1974 at Columbus, Indiana, the average winter temperature is 32 degrees Fahrenheit (°F), and the average summer temperature is 75°F. The average total annual precipitation is 40.2 inches, of which approximately 57 percent occurs during summer months (April through September). (USDA SCS, 1992, 1990, 1979)

3.2 GEOLOGY

Camp Atterbury is located near the southern extent of the Pleistocene continental ice sheets. As the glaciers retreated, masses of material (clay, silt, sand, and gravel) which had accumulated on and in the ice were deposited on the bedrock surface. Glacial meltwaters in Sugar Creek and the East Fork of the White River carved broad stream valleys and later filled them with sand and gravel deposits (Indiana Department of Natural Resources [IDNR], Division of Water, 1966). The northern third of Camp Atterbury is underlain by Wisconsinian age glacial deposits. Deposits of Illinoisian age underlie the south-central portion of the facility. To the west and south, unglaciated soils lie atop the local bedrock (USDA SCS, 1990). Unconsolidated deposits range in thickness from 100 to 150 feet (ft) in the glaciated, northeastern third of the facility, to 0 ft in parts of the unglaciated southwestern portions of Camp Atterbury (Indiana Geological Survey [IGS], 1983).

The bedrock formations underlying Camp Atterbury are layered shale, siltstone, and limestone of Mississippian and Devonian age which dip gently to the west. In the central and western part of Camp Atterbury, the Mississippian age Borden Group shale, siltstones, and fine-grained sandstones lie at the surface. The Borden Group ranges in thickness from 0 ft in the northeast corner of the facility to more than 200 ft in the Norman Upland to the south and west (IGS, 1972). In the northeastern portion of the facility, bedrock consists of Devonian and

Mississippian age New Albany shale which underlies the area now occupied by the East Fork of the White River and some of its tributaries (Sugar Creek and the northern part of the Driftwood River valley) (IGS, 1972). The thickness of the New Albany shale is 100 to 110 ft in the Camp Atterbury area. Between 40 and 125 ft of Devonian limestone underlies the New Albany shale (IGS, 1972).

3.3 SOILS

Camp Atterbury is located near the southern extent of the Pleistocene continental ice sheets. As the glaciers retreated, masses of material (clay, silt, sand, and gravel) which had accumulated on and in the ice were deposited on the bedrock surface. Glacial meltwaters in Sugar Creek and the East Fork of the White River carved broad stream valleys and later filled them with sand and gravel deposits (IDNR, Division of Water, 1966). The northern third of Camp Atterbury is underlain by Wisconsinian age glacial deposits. Glacial deposits of Illinoian age underlie the south-central portion of the facility. To the west and south, unglaciated soils lie atop the local bedrock (USDA SCS, 1990). Unconsolidated fluvial deposits range in thickness from 100 to 150 ft in the glaciated, northeastern third of the facility, to 0 ft in parts of the unglaciated southwestern portions of Camp Atterbury (IGS, 1983).

3.4 SURFACE WATER HYDROLOGY

In general, surface water at Camp Atterbury flows to the east along numerous small drainages and streams which are entrenched in the unglaciated soils and bedrock, and in glaciated soils and till. The area is drained by streams such as Nineveh Creek, Muddy Branch Creek, Saddle Creek, Lick Creek, Catherine Creek, and their tributaries. These streams in turn flow into Sugar Creek and the Driftwood River, which joins the Flatrock River in Columbus to form the East Fork of the White River (USDA SCS, 1979). The East Fork of the Salt Creek and its tributaries drain to the west from the southwestern edge of Camp Atterbury. There are also several small lakes, both on Camp Atterbury property and just west of the facility in Brown County (Cordry Lake and the Prince's Lake Area). A stream gauging station is located in Sugar Creek in Edinburgh, downstream from Youngs Creek, with a 22-year average flow of 485 cubic ft per second (IDNR, 1966).

3.5 HYDROGEOLOGY

The nature and availability of groundwater is associated with the nature and type of aquifer materials present in the area. The Mississippian and Devonian bedrock which underlies Camp Atterbury yields only limited quantities of water (IDNR, 1980). The deposits of the Borden group, which outcrop across the southwestern two-thirds of the facility, are reportedly some of the poorest water-bearing formations in the state. The New Albany Shale and underlying Devonian limestone are expected to yield less than 10 gallons per minute (gpm). Many ponds have been built in the unglaciated region to supply local residential and agricultural needs. The major groundwater sources in the area are in the sand and gravel deposits of the East Fork of the White River valley. Well yields from this aquifer system, which extends from Edinburgh to Columbus, commonly exceed 1,000 gpm (IDNR, 1980). Personnel at Camp Atterbury indicate that attempts to install fire suppression water wells in the southern portion of the facility have been unsuccessful, and that groundwater was not encountered above approximately 200 ft below ground surface (bgs) (McWhorter, 1995).

Well records in the vicinity of the installation indicate a general east-southeast direction of groundwater flow (Weston, 1993). Water levels measured at five monitoring wells near the New Landfill suggest a more south-southeast direction of flow. The shallow depth to water in the valley fill aquifer to the east of Camp Atterbury suggests hydraulic connection between the groundwater and surface water (Weston, 1993; IDNR, 1976). Recharge to groundwater occurs from both the local fluvial system and from direct precipitation. Net monthly precipitation at Camp Atterbury was previously estimated to be three inches (Weston, 1993). Hydraulic communication between groundwater in the valley fill and in the underlying bedrock via fractures and joints is likely. Recharge to the bedrock may occur via infiltration through both glacial and fluvial overburden (Weston, 1993)

Potable water for the city of Edinburgh is supplied by Edinburgh Utilities from four wells producing up to 1,000 gpm from a thick gravel aquifer in the Blue River valley at the north edge of town (Weston, 1993; IDNR, 1966). The wells are screened between approximately 100 and 120 ft bgs (Weston, 1993). The area surrounding Edinburgh is supplied by private wells (Phillips, 1995). In 1966, the well field for Camp Atterbury consisted of nine wells along the

west side of the Blue River, north of Edinburgh. The wells ranged in depth from 66 to 112 ft bgs and were completed in gravel. Capacities of up to 2,000 gpm were obtained (IDNR, 1966). Today, Prince's Lakes Utilities uses these wells to provide water to the population of Camp Atterbury, the city of Nineveh, the Prince's Lake Area, and the Cordry/Sweetwater area. Eastern Bartholomew Utilities also supplies water to the eastern half of Bartholomew County and western Jennings County with two wells (screened between 115 and 135 ft bgs) within three miles of Camp Atterbury (Weston, 1993).

3.6 TOPOGRAPHY

The land surface at Camp Atterbury ranges from relatively flat in the north to steep hills in the south. The north and northeast portion is relatively flat with scattered trees. This portion of Camp Atterbury is located in the region denoted as the Scottsburg Lowland. The Scottsburg Lowland is a nearly level terrain comprising gently sloping river terraces and outwash plains, as well as the mostly level bottomland along Sugar Creek and Blue River (USDA SCS, 1979).

The central and southern parts of Camp Atterbury are rugged and generally heavily wooded, with deeply incised streams (IDNR, Division of Water, 1966). This portion of Camp Atterbury is located on the Norman Upland. The Norman Upland terrain is a severely dissected plain consisting of long, narrow ridges, steep slopes, and narrow stream bottoms. The bedrock is generally siltstone, shale, and sandstone of Mississippian age (USDA SCS, 1990).

4.0 FIELD PROGRAM

This section presents the sampling activities conducted at the CWM burn area. The objective of the sampling activities was to determine the presence or absence of mustard agent and its breakdown products. This was accomplished through a program of soil sampling and sediment sampling. These activities were selected on the basis of available historical information regarding site activities obtained from Camp Atterbury personnel.

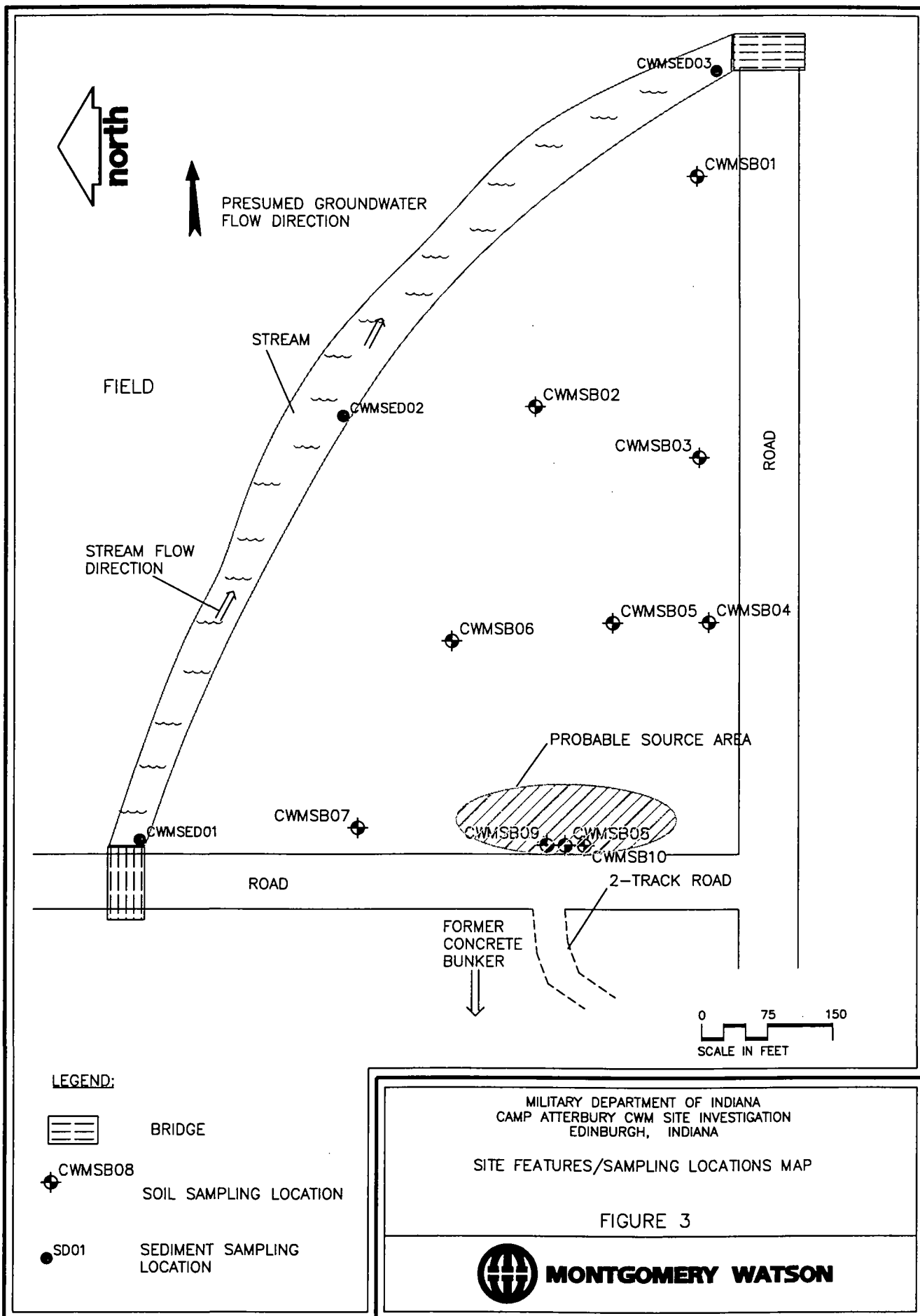
4.1 FIELD SCREENING ACTIVITIES

Field screening for continuous air monitoring was performed during soil and sediment sampling activities for health and safety purposes using a modified chromatograph (MINICAMS™). Screening results are presented in Appendix A. The details of the health and safety screening are included in the Health and Safety Plan. Procedures for use of the MINICAMS™ are included in the laboratory standard operating procedures (SOP) in Appendix A of the QAPjP.

4.2 CONFIRMATION SAMPLING ACTIVITIES

Prior to the commencement of soil and sediment sampling activities, a magnetic survey of the site was conducted by Montgomery Watson using a portable magnetometer. The survey was conducted to determine the presence or absence of magnetic anomalies (i.e. equipment for the use or disposal of mustard agent) and to determine subsequent boring locations. No magnetic anomalies were identified. Therefore, the borings were placed in a grid array in order to completely assess site conditions. The boring locations are shown in Figure 3.

J:\JOBS\033\371803\CADD\SAMPLING LOCATION MAP.DWG



A total of ten soil borings (CWMSB-01, CWMSB-02, CWM-SB03, CWMSB-04, CWMSB-05, CWM-SB06, CWM-SB07, CWMSB-08, CWMSB-09, and CWM-SB10) were drilled. The borings were advanced to a maximum depth of 8 ft bgs and logged for soil type. A composite soil sample was collected from each boring and sent to an off-site fixed laboratory for analysis of mustard agent and its breakdown products (organosulfur compounds and thiodiglycol). The composite sample was collected from ground surface to total depth of the boring. A total of ten soil samples, one duplicate sample, and one matrix spike/matrix spike duplicate (MS/MSD) sample were submitted for laboratory analysis. Boring logs are presented in Appendix B. Chain of Custody forms are presented in Appendix C. Analytical results and quality assurance/quality control (QA/QC) evaluation results are provided in Appendix D. The laboratory analytical program is detailed in the SAP along with sampling methods.

Three sediment samples were collected from the stream which bounds the northeastern portion of the site. The sediment sampling locations are shown in Figure 3. A total of three sediment samples, one duplicate, and one MS/MSD were submitted for laboratory analysis. Chain of Custody forms are presented in Appendix C. Analytical results and QA/QC evaluation results are provided in Appendix D. The laboratory analytical program is detailed in the SAP along with sediment sampling methods.

4.3 INVESTIGATION-DERIVED WASTE MANAGEMENT

IDW generated during the field activities included soil cuttings, disposable and personal protective equipment (PPE), and decontamination fluids. Soil was mixed with bentonite pellets and returned to the boreholes. PPE was placed in polyethylene trash bags. Decontamination fluids were discharged onto the ground surface at the site, as on-site analytical data showed no detection of potential contaminants.

5.0 INVESTIGATIVE FINDINGS

5.1 FIELD SCREENING RESULTS

A total of eleven soil samples (ten samples and one duplicate) and four sediment samples (three samples and one duplicate) were collected for field screening and analyzed using the MIINCAMS™. The analytical results indicate that no mustard agent was detected in any of the soil and sediment samples collected. Screening results are presented in Appendix A.

5.2 CONFIRMATION SAMPLING RESULTS

A total of twelve soil samples (ten samples, one duplicate, and one MS/MSD) and five sediment samples (three samples, one duplicate, and one MS/MSD) were submitted for fixed laboratory analysis. The analytical results indicate that no constituent was detected in the soil and sediment samples collected. Chain of Custody forms are presented in Appendix C. Analytical results and QA/QC evaluation results are provided in Appendix D.

6.0 ARARs

The following sections describe the ARARs for soil and sediment for Camp Atterbury.

5.1 ARARs FOR SOILS

The following is a list of ARARs that were considered in the evaluation of the soils during the field investigation activities.

5.1.1 Action-Specific ARARs

There are no action-specific ARARs that were considered potentially applicable to the soils at Camp Atterbury based on activities or technologies required for remediation activities.

5.1.2 Chemical-Specific ARARs

There were no chemical-specific ARARs to be utilized for the soil investigation. IDEM does not have any recommended criteria. Montgomery Watson used the method detection limits (MDLs) as the criteria for the SI.

5.1.3 Location-Specific ARARs

There are no location-specific ARARs that were considered potentially applicable to the soils at Camp Atterbury.

5.2 ARARs FOR SEDIMENT

The following is a list of ARARs that was considered in the evaluation of the sediment during the field investigation activities.

5.2.1 Action-Specific ARARs

There are no action-specific ARARs that were considered potentially applicable to the sediment at Camp Atterbury based on activities or technologies required for investigation activities.

5.2.2 Chemical-Specific ARARs

There were no chemical-specific ARARs utilized for the sediment investigation at the site. IDEM does not have any recommended criteria. Montgomery Watson used the MDLs as the criteria for the SI.

5.2.3 Location-Specific ARARs

No location-specific ARARs were considered to be potentially applicable to sediment investigation at the Camp Atterbury.

7.0 CONCLUSIONS

Soil samples were collected from ten borings and sediment samples were collected from three locations. All samples were analyzed in the field and submitted to a fixed laboratory for analysis. The analytical results indicate that no constituent of concern was detected in any of the samples collected.

8.0 RECOMMENDATIONS

The analytical results indicate that no constituent of concern was detected in the soil and sediment samples collected for field screening and fixed laboratory analysis. Therefore, Montgomery Watson recommends no further action be taken at the site.

J:\jobs\033\37\SI Report\atterbury cwm si.doc

9.0 REFERENCES

- Indiana Department of Natural Resources (IDNR), Division of Water, 1966. *Water Resources of Johnson County*, prepared by John E. Uhl.
- IDNR, 1976. *Environmental Geologic Maps for Land Use Evaluations in Johnson, County, Indiana*. Environmental Study 10. Prepared by John R. Hill.
- IDNR, 1980. *The Indiana Water Resource, Availability, Uses and Needs*. Published by the Indiana Dept. of Natural Resources, first edition, 1980.
- Indiana Geological Survey (IGS), 1972. *Geologic Map of the 1° by 2° Cincinnati Quadrangle, Indiana and Ohio, Showing Bedrock and Unconsolidated Deposits*.
- IGS, 1983. *Map of Indiana Showing Thickness of Unconsolidated Deposits*. Miscellaneous Map 40.
- McWhorter, Nancy R., 1995. Personal Communication with Donna Courington of Montgomery Watson, October 23-24, 1995.
- Montgomery Watson, 1996. *Site Investigation Report*.
- Montgomery Watson, 1998. *CWM Site Investigation Work Plan*.
- Phillips, Dale, 1995. City of Edinburgh Building Inspector, Personal Communication with Jennifer Bergin of Montgomery Watson, November 13, 1995.
- U.S. Army Environmental Hygiene Agency (USAEHA), *Solid Waste Management Study No. 38-26-0146-81, Atterbury Reserve Forces Training Area, Edinburg Indiana*, 1981.
- U.S. Department of Agriculture, Soil Conservation Service (USDA SCS), 1992. *Soil Survey of Bartholomew County, Indiana*. May 1976 reissued April 1992.
- USDS SCS, 1990. *Soil Survey of Brown County and Part of Bartholomew County, Indiana*, February 1990.
- USDS SCS, 1979. *Soil Survey of Johnson County, Indiana*, January 1979.
- USEPA, September 1994. *Guidance for the Data Quality Objectives Process*. Quality Assurance Management Staff.
- USEPA, October 1991. *Management of Investigation-Derived Waste for Site Investigations*.

Roy F. Weston, Inc., 1993. Final Preliminary Assessment of the National Guard Facility,
Atterbury Reserve Forces Training Area, Edinburgh, Indiana. Prepared for the US Army
Environmental Center, September, 1993.

Willis, Col. Garry L., 1991. *Memorandum for National Guard Bureau*; Blister Agent
Disposal (ARFTA Camp Atterbury), September 19, 1991.

Appendix A



MONTGOMERY WATSON

APPENDIX A
SCREENING RESULTS



ISO 9001 Certified
Chemical/Biological Defense Group

28 May 1998

Mr. David Howell
GP Environmental Services, Inc.
5908 Heatherston Drive
Raleigh, NC 27606

David:

Veridian is pleased to provide this letter report containing the HD extraction results on ten soil and three sediment samples taken from Camp Atterbury, Indiana. Individual composite samples were generated from thirteen locations. A portion of each sample was cleared for head-space HD vapor during the on-site field screening analyses performed on May 5th through 7th. Personnel from Montgomery Watson collected, packaged, and shipped a sample of each soil to Veridian for subsequent extraction analysis.

The text below briefly describes the laboratory extraction and analysis procedures used on the samples and is followed by a table presenting the results:

Approximately five grams of each sample were weighed exactly into clean vials, extracted with 2mL of hot (40°C) methanol and placed into an ultrasonic water bath (also at 40°C) for thirty minutes. The samples were then centrifuged for five minutes and the supernatants filtered through 0.2µm filters into clean GC vials. A 20µl volume of each sample was injected into a gas chromatograph and analyzed for HD using an FPD. All samples were then oven-dried and percent moisture and dry weights were calculated. Data is presented below as micrograms of HD per gram of dry soil.

Table of Results

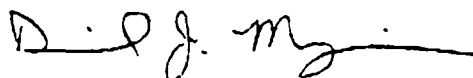
GP Lab ID	Field ID	Veridian ID	Moisture in Sample [%]	Contamination Level (Dry Soil) [µg/g]	Corrected Contamination Level [µg/g]
9805040-01A	CWMSB-01	SOIL-1	20.72	< 0.019	< 0.031
9805040-02A	CWMSB-02	SOIL-2	17.83	< 0.017	< 0.028
9805040-03A	CWMSB-03	SOIL-3	22.61	< 0.019	< 0.032
9805040-04A	CWMSB-04	SOIL-4	20.03	< 0.019	< 0.031
9805040-05A	CWMSB-05	SOIL-5	20.06	< 0.019	< 0.031
9805040-06A	CWMSB-06	SOIL-6	17.69	< 0.017	< 0.028
9805040-07A	CWMSB-07	SOIL-7	16.46	< 0.017	< 0.028
9805040-08A	CWMSB-08	SOIL-8	20.04	< 0.019	< 0.032
9805040-09A	CWMSB-09	SOIL-9	15.88	< 0.016	< 0.026

9805040-10A	CWMSB-10	SOIL-10	17.55	< 0.017	< 0.028
9805040-12A	CWSED-01	SED-1	30.64	< 0.025	< 0.042
9805040-13A	CWSED-02	SED-2	26.03	< 0.020	< 0.033
9805040-14A	CWSED-03	SED-3	19.78	< 0.018	< 0.031

Extractions and GC analyses were performed on 18 May 1998. A series of quality control experiments were run on 20 and 21 May 1998. Two soil and one sediment were randomly selected, spiked with HD at three times the detection limit, extracted, and analyzed using the procedures described above. The method was able to recover 60% of the spike from the soils and 70% from the sediment. The last column in the above table accounts for these extraction efficiencies.

The samples are currently in cold storage at our test site. Please review the test results and advise Veridian as to whether further testing will be required. If you have any questions or require further information please feel free to contact me at (716) 592-7331 or (716) 632-7500 x5353. It has been a pleasure doing business with you and we look forward to supporting you on future tasks.

Sincerely,



David J. Mangino
Principal Chemist & Test Operations Manager
Chemical/Biological Defense Group

Appendix B



MONTGOMERY WATSON

APPENDIX B
BORING LOGS

Project Camp Atterbury
 CWM Investigation
Location Edinburgh, Indiana

Boring No. **CWMSB01**
Job No. **1257033.370304**
Sheet **1** of **1**
Surface Elevation _____
Northing: _____
Easting: _____

Start 5/5/98 End 5/5/98
Driller MW Chief MEV Rig Hand
Logger MEV Editor _____
Drill Method Hand Auger

Case3:17-cv-00001 Document 1-1 Filed 01/11/18 Page 1 of 1
Case3:17-cv-00001 Document 1-1 Filed 01/11/18 Page 1 of 1

**MONTGOMERY
WATSON**



LOG OF TEST BORING

Project Camp Atterbury
CWM Investigation
Location Edinburgh, Indiana

Boring No. CWMSB02
Job No. 1257033.370304
Sheet 1 of 1
Surface Elevation _____
Northing: _____
Easting: _____

41551 Eleven Mile Road, Novi, MI 48375, TEL. (248) 344-0205

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qs) (tsf)	PID (ppm)	Remarks
1	12	M			Dark Brown TOPSOIL			
2	12	M			Medium Stiff, Brown, Silty CLAY (CL)			
3	12	M						
4	12	W						
5	12	W			Medium Dense, Brown, Silty SAND (SM)			
6	12	W			Stiff, Brown, Silty CLAY (CL)			
7	12	M						
8	12	M						
					End of Boring at 8.0 ft Boring Refusal at approx. 7-8 ft bgs			

WATER LEVEL OBSERVATIONS

While Drilling 4.0 ft. Upon Completion of Drilling 4.0 ft.
Time After Drilling _____
Depth to Water _____
Depth to Cave in _____

GENERAL NOTES

Start 5/5/98 End 5/5/98
Driller MW Chief MEV Rig Hand
Logger MEV Editor _____ Auger _____
Drill Method Hand Auger

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

MONTGOMERY WATSON



LOG OF TEST BORING

Project Camp Atterbury
CWM Investigation
Location Edinburgh, Indiana

Boring No. CWMSB03
Job No. 1257033.370304
Sheet 1 of 1
Surface Elevation _____
Northing: _____
Easting: _____

41551 Eleven Mile Road, Novi, MI 48375, TEL. (248) 344-0205

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
1	12	M			Dark Brown TOPSOIL			
2	12	M			Medium Stiff, Brown, Silty CLAY, Trace Fine Gravel (CL)			
3	12	M						
4	12	W						
5	12	W						
6	12	W		5				
7	12	M			Very Stiff, Gray with Brown Mottling, Silty CLAY, Some Medium Gravel (CL)			
8	12	M						
				10	End of Boring at 8.0 ft Boring Refusal at approx. 7-8 ft bgs			
				15				
				20				

WATER LEVEL OBSERVATIONS

While Drilling 4.0 ft. Upon Completion of Drilling ft.
Time After Drilling _____
Depth to Water _____
Depth to Cave in _____

GENERAL NOTES

Start 5/5/98 End 5/5/98
Driller MW Chief MEV Rig Hand
Logger MEV Editor Auger
Drill Method Hand Auger

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

MONTGOMERY WATSON



LOG OF TEST BORING

Project Camp Atterbury
 Location CWM Investigation
Edinburgh, Indiana

Boring No. CWMSB04
 Job No. 1257033.370304
 Sheet 1 of 1
 Surface Elevation _____
 Northing: _____
 Easting: _____

41551 Eleven Mile Road, Novi, MI 48375, TEL. (248) 344-0205

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
1	12	M			Dark Brown TOPSOIL			
2	12	M			Medium Stiff, Brown, Silty CLAY (CL)			
3	12	M						
4	12	M						
5	12	M			Very Stiff, Brown, Silty CLAY with Medium Gravel (CL)			
				5				
					End of Boring at 5.0 ft Boring Refusal at approx. 5 ft bgs			
				10				
				15				
				20				

WATER LEVEL OBSERVATIONS

GENERAL NOTES

While Drilling ft. Upon Completion of Drilling ft.
 Time After Drilling _____
 Depth to Water _____
 Depth to Cave in _____

Start 5/5/98 End 5/5/98
 Driller MW Chief MEV Rig Hand _____
 Logger MEV Editor _____ Auger _____
 Drill Method Hand Auger

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

Project **Camp Atterbury**
CWM Investigation
Location **Edinburgh, Indiana**

Boring No. **CWMSB05**
Job No. **1257033.370304**
Sheet **1** of **1**
Surface Elevation _____
Northing: _____
Easting: _____

CH3VATTER ID: DETROIT2

MONTGOMERY WATSON



LOG OF TEST BORING

Project Camp Atterbury
CWM Investigation
 Location Edinburgh, Indiana

Boring No. CWMSB06
 Job No. 1257033.370304
 Sheet 1 of 1
 Surface Elevation _____
 Northing: _____
 Easting: _____

41551 Eleven Mile Road, Novi, MI 48375, TEL. (248) 344-0205

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
1	12	M			Dark Brown TOPSOIL			
2	12	M			Medium Stiff, Brown, Silty CLAY (CL)			
3	12	M						
4	12	M						
5	12	M/W						
6	12	W			Dense, Brown, Medium SAND (SP)			
7	12	W			Stiff, Brown, Silty CLAY, Some Fine to Medium Gravel (CL)			
8	12	M			Very Stiff, Brown, Silty CLAY (CL)			
					End of Boring at 8.0 ft Boring Refusal at approx. 8 ft bgs			

WATER LEVEL OBSERVATIONS

While Drilling 4.0 ft. Upon Completion of Drilling _____ ft.
 Time After Drilling _____
 Depth to Water _____
 Depth to Cave in _____

GENERAL NOTES



Start 5/5/98 End 5/5/98
 Driller MW Chief MEV Rig Hand _____
 Logger MEV Editor _____ Auger _____
 Drill Method Hand Auger

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

Project	Camp Atterbury
	CWM Investigation
Location	Edinburgh, Indiana

Boring No. CWMSB07
Job No. 1257033.370304
Sheet 1 of 1
Surface Elevation
Northing:
Easting:

GENERAL NOTES

While Drilling  _____ ft. Upon Completion of Drilling  _____ ft.

Time After Drilling _____

Depth to Water _____

Depth to Cave in _____

Start 5/5/98 End 5/5/98
 Driller MW Chief MEV Rig Hand
 Logger MEV Editor _____ Auger
 Drill Method Hand Auger



The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

CA3 VATTER ID: DETROIT2

Project **Camp Atterbury**
CWM Investigation
Location **Edinburgh, Indiana**

Boring No. **CWMSB08**
Job No. **1257033.370304**
Sheet **1** of **1**
Surface Elevation _____
Northing: _____
Easting: _____

GENERAL NOTES

While Drilling  _____ ft. Upon Completion of Drilling  _____ ft.

Time After Drilling	_____	_____	_____	_____
Depth to Water	_____	_____	_____	_____
Depth to Cave in	_____	_____	_____	_____

Start 5/5/98 End 5/5/98
 Driller MW Chief MEV Rig Hand
 Logger MEV Editor _____
 Drill Method Hand Auger

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

Case 3:11-10001 Document 1-1 Filed 02/02/12 Page 1 of 1

**MONTGOMERY
WATSON**



LOG OF TEST BORING

Project Camp Atterbury
CWM Investigation
Location Edinburgh, Indiana

41551 Eleven Mile Road, Novi, MI 48375, TEL. (248) 344-0205

Boring No. CWMSB09
Job No. 1257033.370304
Sheet 1 of 1
Surface Elevation _____
Northing: _____
Easting: _____

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
1	12	M			Dark Brown TOPSOIL			
2	12	M			Medium Stiff, Brown, Silty CLAY (CL)			
3	12	M						
4	12	M						
5	12	M			Very Stiff, Brown, Silty CLAY, Medium Gravel (CL)			
				5				
					End of Boring at 5.0 ft Boring Refusal at 5 ft bgs			
				10				
				15				
				20				

WATER LEVEL OBSERVATIONS

While Drilling ft. Upon Completion of Drilling ft.
Time After Drilling _____
Depth to Water _____
Depth to Cave in _____

GENERAL NOTES

Start 5/5/98 End 5/5/98
Driller MW Chief MEV Rig Hand _____
Logger MEV Editor _____ Auger _____
Drill Method Hand Auger

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

MONTGOMERY WATSON



LOG OF TEST BORING

Project Camp Atterbury
CWM Investigation
 Location Edinburgh, Indiana

Boring No. CWMSB10
 Job No. 1257033.370304
 Sheet 1 of 1
 Surface Elevation _____
 Northing: _____
 Easting: _____

41551 Eleven Mile Road, Novi, MI 48375, TEL. (248) 344-0205

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
1	12	M			Dark Brown TOPSOIL			
2	12	M			Medium Stiff, Brown, Silty CLAY (CL)			
3	12	M						
4	12	M						
5	12	M			Very Stiff, Brown, Silty CLAY, Medium Gravel (CL)			
				5				
					End of Boring at 5.0 ft Boring Refusal at approx. 5 ft bgs			
				10				
				15				
				20				

WATER LEVEL OBSERVATIONS

While Drilling ft. Upon Completion of Drilling ft.
 Time After Drilling _____
 Depth to Water _____
 Depth to Cave in _____

GENERAL NOTES

Start 5/6/98 End 5/6/98
 Driller MW Chief MEV Rig Hand _____
 Logger MEV Editor _____ Auger _____
 Drill Method Hand Auger

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

Appendix C



MONTGOMERY WATSON

APPENDIX C
CHAIN OF CUSTODY FORMS

GP ENVIRONMENTAL SERVICES, INC.

202 Perry Parkway
Gaithersburg, Maryland 20877
(301) 926-6802

Contract #/Billing Reference

1 of 2 Pgs.

Project: Camp AHarbury CWM					Turnaround Time		Std	Std										
Client: Montgomery Watson					# of Containers		2	2										
Send Results To: Leslie Nichols					Container Type		4-02	4-02										
Address: 41551 11 Mile Rd.					Preservative Used		none	none										
Nbi MI 48375					Type of Analysis													
Phone: (248) 344-0205																		
Sample ID#	Date Sampled	Time Sampled	Sample Matrix	Sampler's Initials														
CWMSB-01	5-5-98	0845	soil	MEV	X	X												
CWMSB-02		1000																
CWMSB-03		1115																
CWMSB-04		1150																
CWMSB-05		1310																
CWMSB-06		1445																
CWMSB-07		1530																
CWMSB-08		1600																
CWMSB-09		1730																
CWMSB-09		1730																
CWMSB-10	5-6-98	0610																
CWMSB-10 dup		0610																
Relinquished By:		Date/Time		Received By:		Relinquished By:		Received for Laboratory By:		Date/Time								
[Signature]		5-6-98 1000						C. [Signature]		5/6/98 9:15 AM								
Relinquished By:		Date/Time		Received By:		Date/Time		Shipper:		Airbill No.:								
Relinquished By:		Date/Time		Received By:		Lab Comments:		Temp:										
								3.0										

G.P. W.O. 98-5-040

Appendix D



APPENDIX D

**ANALYTICAL RESULTS AND QUALITY ASSURANCE/QUALITY CONTROL
RESULTS**

GP Work Order # 9805040

SAMPLE ANALYSIS REPORT

Prepared For:

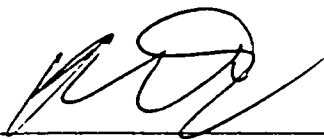
MONTGOMERY WATSON
41551 ELEVEN MILE ROAD
NOVI, MI 48375

CAMP ATTERBURY CWM

Prepared By:

GP Environmental Services, Inc.
202 Perry Parkway
Gaithersburg, MD 20877

June 1, 1998



for Marty Sadoughi, Laboratory Director

GP ENVIRONMENTAL SERVICES
ANALYTICAL RESULTS

Project: CAMP ATTERBURY CWM

MONTGOMERY WATSON
41551 ELEVEN MILE ROAD
NOVI, MI 48375
Atten: BRIGID BROOKS

GP ENVIRONMENTAL SERVICES
202 Perry Parkway
Gaithersburg, MD 20877

Atten: Client Services
Phone: (301) 926-6802

Certified by: 

SAMPLE IDENTIFICATION

GP ID	Client ID
9805040-01A	CWMSB-01
9805040-01B	
9805040-02A	CWMSB-02
9805040-02B	
9805040-03A	CWMSB-03
9805040-03B	
9805040-04A	CWMSB-04
9805040-04B	
9805040-05A	CWMSB-05
9805040-05B	
9805040-06A	CWMSB-06
9805040-06B	
9805040-07A	CWMSB-07
9805040-07B	
9805040-08A	CWMSB-08
9805040-08B	
9805040-09A	CWMSB-09
9805040-09B	
9805040-09C	
9805040-09D	
9805040-10A	CWMSB-10
9805040-10B	
9805040-11A	CWMSB-10-DUP
9805040-11B	
9805040-12A	CWMSD-01
9805040-12B	
9805040-13A	CWMSD-02
9805040-13B	
9805040-13C	
9805040-13D	
9805040-14A	CWMSD-03
9805040-14B	
9805040-15A	CWMSD-03-DUP
9805040-15B	

GP ENVIRONMENTAL SERVICES
ORGANIC ANALYSIS RESULTSGP ID: 9805040-01B
Client ID: CWMSB-01
Collected: 05/05/98
Dilution: 1Matrix: SOIL
Method: LL03 GC-FPD
Units: ug/KgAnalyst: ABC
Analyzed: 05/20/98
Prepared: 05/11/98

GC TARGET COMPOUNDS

Parameter	Result	Rep.Lim.	Qualifier
Dimethyldisulfide	BQL	125	
1,4-Oxathiane	BQL	250	
1,4-Dithiane	BQL	125	
p-Chlorophenylmethylsulfide	BQL	250	
Benzothiazole	BQL	250	
p-Chlorophenylmethylsulfoxide	BQL	250	
p-Chlorophenylmethylsulfone	BQL	250	

GP ENVIRONMENTAL SERVICES
ORGANIC ANALYSIS RESULTSGP ID: 9805040-02B
Client ID: CWMSB-02
Collected: 05/05/98
Dilution: 1Matrix: SOIL
Method: LL03 GC-FPD
Units: ug/KgAnalyst: ABC
Analyzed: 05/20/98
Prepared: 05/11/98

GC TARGET COMPOUNDS

Parameter	Result	Rep.Lim.	Qualifier
Dimethyldisulfide	BQL	118	
1,4-Oxathiane	BQL	237	
1,4-Dithiane	BQL	118	
p-Chlorophenylmethyldisulfide	BQL	237	
Benzothiazole	BQL	237	
p-Chlorophenylmethyldisulfoxide	BQL	237	
p-Chlorophenylmethyldisulfone	BQL	237	

GP ENVIRONMENTAL SERVICES
ORGANIC ANALYSIS RESULTSGP ID: 9805040-03B
Client ID: CWMSB-03
Collected: 05/05/98
Dilution: 1Matrix: SOIL
Method: LL03 GC-FPD
Units: ug/KgAnalyst: ABC
Analyzed: 05/20/98
Prepared: 05/11/98

GC TARGET COMPOUNDS

Parameter	Result	Rep.Lim.	Qualifier
Dimethyldisulfide	BQL	121	
1,4-Oxathiane	BQL	242	
1,4-Dithiane	BQL	121	
p-Chlorophenylmethylsulfide	BQL	242	
Benzothiazole	BQL	242	
p-Chlorophenylmethylsulfoxide	BQL	242	
p-Chlorophenylmethylsulfone	BQL	242	

GP ENVIRONMENTAL SERVICES
ORGANIC ANALYSIS RESULTSGP ID: 9805040-048
Client ID: CWMSB-04
Collected: 05/05/98
Dilution: 1Matrix: SOIL
Method: LL03 GC-FPD
Units: ug/KgAnalyst: ABC
Analyzed: 05/20/98
Prepared: 05/11/98

GC TARGET COMPOUNDS

Parameter	Result	Rep.Lim.	Qualifier
Dimethyldisulfide	BQL	122	
1,4-Oxathiane	BQL	245	
1,4-Dithiane	BQL	122	
p-Chlorophenylmethylsulfide	BQL	245	
Benzothiazole	BQL	245	
p-Chlorophenylmethylsulfoxide	BQL	245	
p-Chlorophenylmethylsulfone	BQL	245	

GP ENVIRONMENTAL SERVICES
ORGANIC ANALYSIS RESULTSGP ID: 9805040-058
Client ID: CWMSB-05
Collected: 05/05/98
Dilution: 1Matrix: SOIL
Method: LL03 GC-FPD
Units: ug/KgAnalyst: ABC
Analyzed: 05/20/98
Prepared: 05/11/98

GC TARGET COMPOUNDS

Parameter	Result	Rep.Lim.	Qualifier
Dimethyldisulfide	BQL	124	
1,4-Oxathiane	BQL	249	
1,4-Dithiane	BQL	124	
p-Chlorophenylmethylsulfide	BQL	249	
Benzothiazole	BQL	249	
p-Chlorophenylmethylsulfoxide	BQL	249	
p-Chlorophenylmethylsulfone	BQL	249	

GP ENVIRONMENTAL SERVICES
ORGANIC ANALYSIS RESULTSGP ID: 9805040-068
Client ID: CWMSB-06
Collected: 05/05/98
Dilution: 1Matrix: SOIL
Method: LL03 GC-FPD
Units: ug/KgAnalyst: ABC
Analyzed: 05/20/98
Prepared: 05/11/98

GC TARGET COMPOUNDS

Parameter	Result	Rep.Lim.	Qualifier
Dimethyldisulfide	BQL	119	
1,4-Oxathiane	BQL	239	
1,4-Dithiane	BQL	119	
p-Chlorophenylmethyldisulfide	BQL	239	
Benzothiazole	BQL	239	
p-Chlorophenylmethyldisulfoxide	BQL	239	
p-Chlorophenylmethyldisulfone	BQL	239	

GP ENVIRONMENTAL SERVICES
ORGANIC ANALYSIS RESULTSGP ID: 9805040-07B
Client ID: CWMSB-07
Collected: 05/05/98
Dilution: 1Matrix: SOIL
Method: LL03 GC-FPD
Units: ug/KgAnalyst: ABC
Analyzed: 05/20/98
Prepared: 05/11/98

GC TARGET COMPOUNDS

Parameter	Result	Rep.Lim.	Qualifier
Dimethyldisulfide	BQL	123	
1,4-Oxathiane	BQL	247	
1,4-Dithiane	BQL	123	
p-Chlorophenylmethyldisulfide	BQL	247	
Benzothiazole	BQL	247	
p-Chlorophenylmethyldisulfoxide	BQL	247	
p-Chlorophenylmethyldisulfone	BQL	247	

GP ENVIRONMENTAL SERVICES
ORGANIC ANALYSIS RESULTSGP ID: 9805040-088
Client ID: CWMSB-08
Collected: 05/05/98
Dilution: 1Matrix: SOIL
Method: LL03 GC-FPD
Units: ug/KgAnalyst: ABC
Analyzed: 05/20/98
Prepared: 05/11/98

GC TARGET COMPOUNDS

Parameter	Result	Rep.Lim.	Qualifier
Dimethyldisulfide	BQL	123	
1,4-Oxathiane	BQL	247	
1,4-Dithiane	BQL	123	
p-Chlorophenylmethyldisulfide	BQL	247	
Benzothiazole	BQL	247	
p-Chlorophenylmethyldisulfoxide	BQL	247	
p-Chlorophenylmethyldisulfone	BQL	247	

GP ENVIRONMENTAL SERVICES
ORGANIC ANALYSIS RESULTSGP ID: 9805040-09C
Client ID: CWMSB-09
Collected: 05/05/98
Dilution: 1Matrix: SOIL
Method: LL03 GC-FPD
Units: ug/KgAnalyst: ABC
Analyzed: 05/20/98
Prepared: 05/11/98

GC TARGET COMPOUNDS

Parameter	Result	Rep.Lim.	Qualifier
Dimethyldisulfide	BQL	118	
1,4-Oxathiane	BQL	236	
1,4-Dithiane	BQL	118	
p-Chlorophenylmethyldisulfide	BQL	236	
Benzothiazole	BQL	236	
p-Chlorophenylmethyldisulfoxide	BQL	236	
p-Chlorophenylmethyldisulfone	BQL	236	

GP ENVIRONMENTAL SERVICES
ORGANIC ANALYSIS RESULTSGP ID: 9805040-108
Client ID: CWMSB-10
Collected: 05/06/98
Dilution: 1Matrix: SOIL
Method: LL03 GC-FPD
Units: ug/KgAnalyst: ABC
Analyzed: 05/20/98
Prepared: 05/11/98

GC TARGET COMPOUNDS

Parameter	Result	Rep.Lim.	Qualifier
Dimethyldisulfide	BQL	123	
1,4-Oxathiane	BQL	246	
1,4-Dithiane	BQL	123	
p-Chlorophenylmethysulfide	BQL	246	
Benzothiazole	BQL	246	
p-Chlorophenylmethysulfoxide	BQL	246	
p-Chlorophenylmethysulfone	BQL	246	

GP ENVIRONMENTAL SERVICES
ORGANIC ANALYSIS RESULTS

GP ID: 9805040-11B

Matrix: SOIL

Analyst: ABC

Client ID: CWMSB-10-DUP

Method: LL03 GC-FPD

Analyzed: 05/20/98

Collected: 05/06/98

Units: ug/Kg

Prepared: 05/11/98

Dilution: 1

GC TARGET COMPOUNDS

Parameter	Result	Rep.Lim.	Qualifier
Dimethyldisulfide	BQL	129	
1,4-Oxathiane	BQL	259	
1,4-Dithiane	BQL	129	
p-Chlorophenylmethylsulfide	BQL	259	
Benzothiazole	BQL	259	
p-Chlorophenylmethylsulfoxide	BQL	259	
p-Chlorophenylmethylsulfone	BQL	259	

GP ENVIRONMENTAL SERVICES
ORGANIC ANALYSIS RESULTSGP ID: 9805040-12B
Client ID: CWMSED-01
Collected: 05/06/98
Dilution: 1Matrix: SEDIMENT
Method: LL03 GC-FPD
Units: ug/KgAnalyst: ABC
Analyzed: 05/20/98
Prepared: 05/11/98

GC TARGET COMPOUNDS

Parameter	Result	Rep.Lim.	Qualifier
Dimethyldisulfide	BQL	151	
1,4-Oxathiane	BQL	303	
1,4-Dithiane	BQL	151	
p-Chlorophenylmethyldisulfide	BQL	303	
Benzo[thiazole]	BQL	303	
p-Chlorophenylmethylsulfoxide	BQL	303	
p-Chlorophenylmethylsulfone	BQL	303	

G.P. Environmental Services

Possible notes and definitions for this report:

- BQL** = Below Quantitation Limit
- J** = Value is less than the reporting limits but greater than zero
- P** = Indicates that there is greater than 25% difference for detected pesticide/Aroclor results between the two GC columns
- B** = Indicates that the compound was found in the associated blank
- E** = Indicates that the concentration exceeded the calibration range of the instrument
- U** = Indicates that the compound was analyzed for but not detected, number indicates the reporting limit
- D** = Indicates that the compound was found in an analysis at a secondary dilution factor
- *** = Value obtained from a 1:5 dilution
- +** = Value obtained from a 1:10 dilution
- #** = Value obtained from a 1:20 dilution
- =** = Value obtained from a 1:25 dilution
- ^** = Value obtained from a 1:50 dilution
- = Value obtained from a 1:100 dilution
- !** = Value obtained from a 1:250 dilution
- @** = Value obtained from a 1:125 dilution (medium level)
- \$** = Value obtained from a 1:500 dilution
- &** = Value obtained from a 1:1000 dilution
- N** = Flashpoint not observed; heated to specified limit
- R** = Flammable at room temperature
- TNTC** = Too numerous to count
- B.P.** = Detection limit taken from boiling point
- F.F.** = Sample gave off flammable fumes

SAMPLE RECEIPT CHECKLIST

N.O. No. 91-05-080 Carrier Name FEDER
 Client Name MAN-604 ER Prepared (Logged In) By L Initials 1 Date 7/1/94
 Date Received 7/1/94 Project CON-472 RLY CHL
 Time Received 7:20 AM Site _____
 Received By L VOA Holding Blank LD. No. _____

Airbill/Manifest Present? YES NO
 No. 80-71877180 ☒ -

Trip Blanks Received? YES NO
 No. of Sets _____ ☒ 4

Shipping Container in Good Condition? ☒ -

VOA Vials Have Zero Headspace? ☒ 4

Custody Seals Present on Shipping Container? ☒ -
 Condition: Good ☒ Broken _____

Preservatives Added to Sample? ☒ 4

Chain-of-Custody Present? ☒ -

pH Check Required? ☒ 4
 Performed By? _____

Chain-of-Custody Agrees with Sample Labels? ☒ -

Ice Present in Shipping Container? ☒ (USED)

Chain-of-Custody Signed? ☒ -

Container# Temperature

Packing Present in Shipping Container? ☒ -
 Type of Packing 24 G/100 ME WETS

41 3.0

Custody Seals on Sample Bottles? ☒ -
 Condition: Good _____ Broken _____

Total Number of Sample Bottles 34

Total Number of Samples 17

Samples Intact? ☒ -

Project Manager Contacted?

Sufficient Sample Volume for Indicated Test? ☒ -

Name: L
 Date Contacted: 7-7-94

Any NO response must be detailed in the comments section below. If items are not applicable to particular samples or contracts, they should be marked N/A.

COMMENTS: Temp taken from Temp block.

Checklist Completed by L

Date 7/1/94

Response Factor Report HPLC2

Method : C:\THIO.M
 Title : THIO- SEVEN POINT CALIBRATION
 Last Update : Thu Nov 13 14:59:40 1997
 Response via : Initial Calibration

Calibration Files

LEV1 =P04506.D LEV2 =P04507.D LEV3 =P04508.D
 LEV4 =P04509.D LEV5 =P04510.D LEV6 =P04511.D

	Compound	LEV1	LEV2	LEV3	LEV4	LEV5	LEV6	Avg	%RS
1) T	CHLOROACETIC ACID	2.979	2.825	3.035	3.289	3.248	3.381	3.131 E6	6.2
2) T	THIODIGLYCOL	2.416	2.233	2.343	2.400	2.359	2.523	2.378 E7	3.6

Evaluate Continuing Calibration Report

Data File : J:\LCDATA\HPLC4\MAY2298\P06849.D
 Acq On : 22 May 98 11:33 AM
 Sample : THIO 10PPM
 Misc :
 IntFile : events.e

Vial: 1
 Operator: LF
 Inst : HPLC4
 Multiplr: 1.00

Method : J:\LCDATA\HPLC4\METHODS\THIO.M
 Title : THIO- SEVEN POINT CALIBRATION
 Last Update : Thu May 14 10:44:46 1998
 Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
 Max. RRF Dev : 25% Max. Rel. Area : 150%

Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1 T THIODIGLYCOL	23.775	27.165 E6	-14.3	102	0.09

3EX
SOIL EXPLOSIVES MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: GP ENVIRONMENTAL SERVICES, Contract: MONTGOMERY
 Lab Code: GP_ENV Case No.: N/A SAS No.: N/A SDG No.: N/A
 Matrix Spike - EPA Sample No.: CWMSB-09 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
THIODIGLYCOL	59000	0.0	52000	88	38 - 116

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS	
					RPD	REC.
THIODIGLYCOL	59000	53000	90	2	25	38 - 116

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 1 outside limits

Spike Recovery: 0 out of 2 outside limits

COMMENTS: _____

3EX
SOIL EXPLOSIVES MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: GP ENVIRONMENTAL SERVICES, Contract: MONTGOMERY
 Lab Code: GP_ENV Case No.: N/A SAS No.: N/A SDG No.: N/A
 Matrix Spike - EPA Sample No.: CWMSED-02 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
THIODIGLYCOL	73000	0.0	60000	82	38- 116

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
THIODIGLYCOL	73000	59000	81	1	25	38 - 116

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 1 outside limits

Spike Recovery: 0 out of 2 outside limits

COMMENTS: _____

*ORGANOPHOSPHOROUS
QC*

CASE NARRATIVE

THIODIGLYCOL

Client : MONT_WATSON

W.O.No. : 9805040

SDG # : N/A

Date : 5/29/98

1. Fifteen soil samples were received on May 7, 1998. Samples were extracted and analyzed for Thiodiglycol using LW18 methodologies.
2. MS/ MSD analyses were performed on sample CMWSB-09 and CMWSED-02.
3. Manual integration was performed on some data files as integration provided by the software was inappropriate for some analytes.

L.7 5/29/98
(7.7) 5/29/98

ORGANOSULFUR CONTINUING CHECK STANDARD

DATA FILE=N09582

DATE OF ANALYSIS: — 20-May-98

LLO3-4 (Level =4)

COMPOUNDS:	True Value PPB	CC CONC. PPB	(+/- 25%) % DIFFERNCE	% RECOVERY OF C.C. COMPOUND
Dimethyldisulfide	200	206.037	3.019	103
1,4-Oxathiane	400	419.705	4.926	105
1,4-Dithiane	200	211.227	5.614	106
Benzothiozole	400	406.605	1.651	102
2-Bromothioanusoie (SURR)	600	607.281	1.213	101
p-chlorophenylmethysulfide	400	419.185	4.796	105
p-chlorophenylmethysulfoxide	400	403.774	0.944	101
p-chlorophenylmethysulfone	400	411.620	2.905	103

C.C. CHECK

ORGANOSULFUR CONTINUING CHECK STANDARD

DATA FILE=N09593

DATE OF ANALYSIS:—

20-May-98

LLO3-4 (Level =4)

COMPOUNDS:	True Value PPB	CC CONC. PPB	(+/- 25%) % DIFFERNCE	% RECOVERY OF C.C. COMPOUND
Dimethyldisulfide	200	206.230	3.115	103
1,4-Oxathiane	400	414.071	3.518	104
1,4-Dithiane	200	213.699	6.850	107
Benzothioazole	400	404.526	1.132	101
2-Bromothiobenzosulfone (SURR)	600	622.492	3.749	104
p-chlorophenylmethanethiol	400	408.976	2.244	102
p-chlorophenylmethanesulfoxide	400	405.240	1.310	101
p-chlorophenylmethanesulfone	400	415.212	3.803	104

Evaluate Continuing Calibration Report

Data File : J:\LCDATA\HPLC4\MAY2298\P06873.D
 Acq On : 22 May 98 04:45 PM
 Sample : THIO 10PPM
 Misc :
 IntFile : events.e

Vial: 25
 Operator: LF
 Inst : HPLC4
 Multiplr: 1.00

Method : J:\LCDATA\HPLC4\METHODS\THIO.M
 Title : THIO- SEVEN POINT CALIBRATION
 Last Update : Thu May 14 10:44:46 1998
 Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
 Max. RRF Dev : 25% Max. Rel. Area : 150%

Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1 T THIODIGLYCOL	23.775	26.118 E6	-9.9	98	-0.02

(#) = Out of Range

SPCC's out = 0 CCC's out = 0

P06873.D THIO.M

Fri May 22 16:58:06 1998

W52_HPGC

Page 1

019

1B
EXPLOSIVES ANALYSIS DATA SHEET

EPA SAMPLE NO.

TDBLKA

Lab Name: GP ENVIRONMENTAL SERVICES, Contract: MONTGOM

Lab Code: GP_ENV Case No.: N/A SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) SOIL Lab Sample ID: TDBLK-032

Sample wt/vol: 10 (g/ml) G Lab File ID: P06850.D

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted:(Y/N) N Date Extracted: 05/11/98

Concentrated Extract Volume: 25000 (uL) Date Analyzed: 05/22/98

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

111-48-8	THIODIGLYCOL	500.0	U
----------	--------------	-------	---

Response Factor Report HPLC2

Method : C:\THIO.M
 Title : THIO- SEVEN POINT CALIBRATION
 Last Update : Thu Nov 13 14:59:40 1997
 Response via : Initial Calibration

Calibration Files

LEV1 =P04506.D LEV2 =P04507.D LEV3 =P04508.D
 LEV4 =P04509.D LEV5 =P04510.D LEV6 =P04511.D

	Compound	LEV1	LEV2	LEV3	LEV4	LEV5	LEV6	Avg	%RS
1) T	CHLOROACETIC ACID	2.979	2.825	3.035	3.289	3.248	3.381	3.131 E6	6.2
2) T	THIODIGLYCOL	2.416	2.233	2.343	2.400	2.359	2.523	2.378 E7	3.6

Evaluate Continuing Calibration Report

Data File : J:\LCDATA\HPLC4\MAY2298\P06849.D
 Acq On : 22 May 98 11:33 AM
 Sample : THIO 10PPM
 Misc :
 IntFile : events.e

Vial: 1
 Operator: LF
 Inst : HPLC4
 Multiplr: 1.00

Method : J:\LCDATA\HPLC4\METHODS\THIO.M
 Title : THIO- SEVEN POINT CALIBRATION
 Last Update : Thu May 14 10:44:46 1998
 Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
 Max. RRF Dev : 25% Max. Rel. Area : 150%

Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1 T THIODIGLYCOL	23.775	27.165 E6	-14.3	102	0.09

3EX
SOIL EXPLOSIVES MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: GP ENVIRONMENTAL SERVICES, Contract: MONTGOMERY
 Lab Code: GP_ENV Case No.: N/A SAS No.: N/A SDG No.: N/A
 Matrix Spike - EPA Sample No.: CWMSED-02 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
THIODIGLYCOL	73000	0.0	60000	82	38 - 116

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS	
					RPD	REC.
THIODIGLYCOL	73000	59000	81	1	25	38 - 116

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 1 outside limits

Spike Recovery: 0 out of 2 outside limits

COMMENTS: _____

4EX
EXPLOSIVES METHOD BLANK SUMMARY

EPA SAMPLE NO.

TDBLKA

Lab Name: GP ENVIRONMENTAL SERVICES, Contract: MONTGOM
 Lab Code: GP_ENV Case No.: N/A SAS No.: N/A SDG No.: N/A
 Lab File ID: P06850.D Lab Sample ID: TDBLK-032
 Instrument ID: HPLC 4 Date Extracted: 05/11/98
 Matrix: (soil/water) SOIL Date Analyzed: 05/22/98
 Level: (low/med) LOW Time Analyzed: 11:46

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01 CWMSB-01	9805040-01B	P06852.D	05/22/98
02 CWMSB-02	9805040-02B	P06853.D	05/22/98
03 CWMSB-03	9805040-03B	P06854.D	05/22/98
04 CWMSB-04	9805040-04B	P06855.D	05/22/98
05 CWMSB-05	9805040-05B	P06856.D	05/22/98
06 CWMSB-06	9805040-06B	P06857.D	05/22/98
07 CWMSB-07	9805040-07B	P06858.D	05/22/98
08 CWMSB-08	9805040-08B	P06859.D	05/22/98
09 CWMSB-09	9805040-09C	P06861.D	05/22/98
10 CWMSB-09 MS	9805040-09C MS	P06862.D	05/22/98
11 CWMSB-09 MSD	9805040-09C MSD	P06863.D	05/22/98
12 CWMSB-10	9805040-10B	P06864.D	05/22/98
13 CWMSB-10 DUP	9805040-11B	P06865.D	05/22/98
14 CWMSD-01	9805040-12B	P06866.D	05/22/98
15 CWMSD-02	9805040-13C	P06867.D	05/22/98
16 CWMSD-02 MS	9805040-13C MS	P06868.D	05/22/98
17 CWMSD-02 MSD	9805040-13C MSD	P06869.D	05/22/98
18 CWMSD-03	9805040-14B	P06870.D	05/22/98
19 CWMSD-03 DUP	9805040-15B	P06872.D	05/22/98

COMMENTS:

CASE NARRATIVE

THIODIGLYCOL

Client : MONT_WATSON

W.O.No. : 9805040

SDG # : N/A

Date : 5/29/98

1. Fifteen soil samples were received on May 7, 1998. Samples were extracted and analyzed for Thiodiglycol using LW18 methodologies.
2. MS/ MSD analyses were performed on sample CMWSB-09 and CMWSED-02.
3. Manual integration was performed on some data files as integration provided by the software was inappropriate for some analytes.

1.7 5/27/98

(1.7) 5/29/98

3EX
SOIL EXPLOSIVES MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: GP ENVIRONMENTAL SERVICES, Contract: MONTGOMERY
 Lab Code: GP_ENV Case No.: N/A SAS No.: N/A SDG No.: N/A
 Matrix Spike - EPA Sample No.: CWMSB-09 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
THIODIGLYCOL	59000	0.0	52000	88	38 - 116

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS	
					RPD	REC.
THIODIGLYCOL	59000	53000	90	2	25	38 - 116

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 1 outside limits

Spike Recovery: 0 out of 2 outside limits

COMMENTS: _____

1B
ORGANOSULFUR ANALYSIS DATA SHEET

EPA SAMPLE NO.

OSBLK-A

Lab Name: GP Environmental Services Contract: MONT_WA

Lab Code: GPS Case No.: N/A SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) SOIL Lab Sample ID: OSBLK-768

Sample wt/vol: 10 (g/ml) G Lab File ID: N09572.D

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted: 05/11/98

Concentrated Extract Volume: 20000 (uL) Date Analyzed: 05/20/98

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

624-92-0	Dimethyldisulfide	100.0	U
15890-15-1	1,4-Oxathiane	200.0	U
505-29-3	1,4-Dithiane	100.0	U
95-16-9	Benzothiazole	200.0	U
123-09-1	p-chlorophenylmethylsulfide	200.0	U
934-73-6	p-chlorophenylmethylsulfoxide	200.0	U
98-57-7	p-chlorophenylmethylsulfone	200.0	U

***ORGANOPHOSPHOROUS
QC***

GP Environmental Services

ORGANOSULFUR CONTINUING CHECK STANDARD

DATA FILE=N09593

DATE OF ANALYSIS: — 20-May-98

LLO3-4 (Level =4)

COMPOUNDS:	True Value PPB	CC CONC. PPB	(+/- 25%) % DIFFERNCE	% RECOVERY OF C.C. COMPOUND
Dimethyldisulfide	200	206.230	3.115	103
1,4-Oxathiane	400	414.071	3.518	104
1,4-Dithiane	200	213.699	6.850	107
Benzothioazole	400	404.526	1.132	101
2-Bromothioanazole (SURR)	600	622.492	3.749	104
p-chlorophenylmethysulfide	400	408.976	2.244	102
p-chlorophenylmethysulfoxide	400	405.240	1.310	101
p-chlorophenylmethysulfone	400	415.212	3.803	104

C.C. CHECK

009

ORGANOSULFUR CONTINUING CHECK STANDARD

DATA FILE=N09600

DATE OF ANALYSIS:—

21-May-98

LLO3-4 (Level =4)

COMPOUNDS:	True Value PPB	CC CONC. PPB	(+/- 25%) % DIFFERNCE	% RECOVERY OF C.C. COMPOUND
Dimethyldisulfide	200	211.658	5.829	106
1,4-Oxathiane	400	434.453	8.613	109
1,4-Dithiane	200	212.507	6.254	106
Benzothiozole	400	408.180	2.045	102
2-Bromothioanazole (SURR)	600	637.633	6.272	106
p-chlorophenylmethylsulfide	400	426.658	6.665	107
p-chlorophenylmethysulfoxide	400	421.289	5.322	105
p-chlorophenylmethysulfone	400	424.249	6.062	106

C.C. CHECK

4UL04/LL03
ORGANOSULFUR METHOD BLANK SUMMARY

EPA SAMPLE NO.

OSBLK-A

Lab Name: GP Environmental Services Contract: MONT_WA
Lab Code: GPS Case No.: N/A SAS No.: N/A SDG No.: N/A
Lab File ID: N09572.D Lab Sample ID: OSBLK-768
Instrument ID: GC_FPD Date Extracted: 05/11/98
Matrix: (soil/water) SOIL Date Analyzed: 05/20/98
Level: (low/med) LOW Time Analyzed: 15:13

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	LL-LCS A	OSBLK-768 LL	N09573.D
02	HL1-LCS A	OSBLK-768 HL-1	N09574.D
03	HL2-LCS A	OSBLK-768 HL-2	N09575.D
04	CWMSB-01	9805040-01B	N09576.D
05	CWMSB-02	9805040-02B	N09577.D
06	CWMSB-03	9805040-03B	N09578.D
07	CWMSB-04	9805040-04B	N09579.D
08	CWMSB-05	9805040-05B	N09580.D
09	CWMSB-07	9805040-07B	N09583.D
10	CWMSB-08	9805040-08B	N09584.D
11	CWMSB-09	9805040-09C	N09585.D
12	CWMSB-09 MS	9805040-09C MS	N09586.D
13	CWMSB-09 MSD	9805040-09C MSD	N09587.D
14	CWMSB-10	9805040-10B	N09588.D
15	CWMSB-10-DUP	9805040-11B	N09589.D
16	CWMSB-01	9805040-12B	N09590.D
17	CWMSB-02	9805040-13C	N09591.D
18	CWMSB-02 MSD	9805040-13C MSD	N09594.D
19	CWMSB-03	9805040-14B	N09595.D
20	CWMSB-03-DUP	9805040-15B	N09596.D
21	CWSB-06	9805040-06B	N09597.D
22	CWMSB-02 MS	9805040-13C MS	N09598.D

COMMENTS:

ORGANOSULFUR CONTINUING CHECK STANDARD

DATA FILE=N09582

DATE OF ANALYSIS: —

20-May-98

LLO3-4 (Level =4)

COMPOUNDS:	True Value PPB	CC CONC. PPB	(+/- 25%) % DIFFERNCE	% RECOVERY OF C.C. COMPOUND
Dimethyldisulfide	200	206.037	3.019	103
1,4-Oxathiane	400	419.705	4.926	105
1,4-Dithiane	200	211.227	5.614	106
Benzothiozole	400	406.605	1.651	102
2-Bromothioanusoie (SURR)	600	607.281	1.213	101
p-chlorophenylmethysulfide	400	419.185	4.796	105
p-chlorophenylmethysulfoxide	400	403.774	0.944	101
p-chlorophenylmethysulfone	400	411.620	2.905	103

C.C. CHECK

3LL03
SOIL ORGANOSULFUR MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: GP Environmental Services Contract: MONT_WAT_NO
 Lab Code: GPS Case No.: N/A SAS No.: N/A SDG No.: N/A
 Matrix Spike - EPA Sample No.: CWMSB-09 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Dimethyldisulfide	470	0.0	440	94	36 - 152
1,4-Oxathiane	950	0.0	1200	126	46 - 131
1,4-Dithiane	950	0.0	970	102	54 - 125
Benzothiazole	1900	0.0	1700	89	67 - 126
p-chlorophenylmethylsulfide	1900	0.0	2100	111	69 - 123
p-chlorophenylmethylsulfoxide	1900	0.0	4000	211 *	60 - 119
p-chlorophenylmethylsulfone	1900	0.0	2500	132 *	68 - 119

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
Dimethyldisulfide	470	460	98	4	25	36 - 152
1,4-Oxathiane	950	1200	126	0	25	46 - 131
1,4-Dithiane	950	980	103	1	25	54 - 125
Benzothiazole	1900	1800	95	7	25	67 - 126
p-chlorophenylmethylsulfide	1900	2100	111	0	25	69 - 123
p-chlorophenylmethylsulfoxide	1900	4100	216 *	2	25	60 - 119
p-chlorophenylmethylsulfone	1900	2500	132 *	0	25	68 - 119

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 7 outside limits

Spike Recovery: 4 out of 14 outside limits

COMMENTS:

SOIL ORGANOSULFUR MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: GP Environmental Services Contract: MONT_WAT_NO
 Lab Code: GPS Case No.: N/A SAS No.: N/A SDG No.: N/A
 Matrix Spike - EPA Sample No.: CWMSED-02 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Dimethyldisulfide	580	0.0	520	90	36 - 152
1,4-Oxathiane	1200	0.0	1400	117	46 - 131
1,4-Dithiane	1200	0.0	1000	83	54 - 125
Benzothiazole	2300	0.0	1900	83	67 - 126
p-chlorophenylmethylsulfide	2300	0.0	2000	87	69 - 123
p-chlorophenylmethylsulfoxide	2300	0.0	4500	196 *	60 - 119
p-chlorophenylmethylsulfone	2300	0.0	2800	122 *	68 - 119

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS	
					RPD	REC.
Dimethyldisulfide	580	500	86	5	25	36 - 152
1,4-Oxathiane	1200	1400	117	0	25	46 - 131
1,4-Dithiane	1200	1000	83	0	25	54 - 125
Benzothiazole	2300	1800	78	6	25	67 - 126
p-chlorophenylmethylsulfide	2300	1700	74	16	25	69 - 123
p-chlorophenylmethylsulfoxide	2300	4600	200 *	2	25	60 - 119
p-chlorophenylmethylsulfone	2300	2700	117	4	25	68 - 119

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 7 outside limits

Spike Recovery: 3 out of 14 outside limits

COMMENTS:

5. An unknown peak was detected between the retention time of p-chlorophenylmethanesulfoxide and p-chlorophenylmethanesulfone. The peak was present in two samples, client ID numbers CWMSD-01 and CWMSD-03-DUP. To confirm whether the unknown peak is either of the two compounds, the two target analytes standards and the two samples were injected into the GC/MS instrument. Results indicated that the unknown peak was neither p-chlorophenylmethanesulfoxide nor p-chlorophenylmethanesulfone. Data were included in this package from the GC/MS run.

Ⓢ 5/25/98

2LL03

Lab Name: GP Environmental Services Contract: MONT_WAT_NO
Lab Code: GPS Case No.: N/A SAS No.: N/A SDG No.: N/A
Level: (low/med) LOW

[illegible]

S1 = 2-Bromothioanisol

QC LIMITS
(50-126)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogate diluted out

*ORGANOSULFUR
QC*

CASE NARRATIVE
ORGANOSULFUR ANALYSES

Client : MONTGOMERY WATSON

W.O. # : 9805040

DATE : May 28, 1998

SDG : N/A

1. Fifteen soil samples were received on May 07, 1998. These samples were extracted and analyzed for ORGANOSULFUR compounds using modified USATHAMA LLO3 methodologies.
2. MS and MSD analyses were performed on client ID numbers CWMSB-09 and CWMSD-02. Surrogate recovery on one sample, client ID number CWMSD-03 was outside QC limit.
3. Since the calibration of the GC/FPD instrument produces a quadratic curve, we have plotted the response vs. the concentration utilizing a quadratic curve fitting software. Also, since the curve is quadratic, EPA-CLP forms 6 and 7 are not applicable. We have analyzed a continuing check standard (which is at the mid point calibration concentration) and calculated its concentration from the initial calibration quadratic curve, to verify that the instrument performance has not varied. We consider this continuing check standard to be acceptable if the calculated concentration has less than a twenty five percent difference from the true concentration. The true concentration of the compounds in the continuing check standards are as follows.

1,4-Dimethyl disulfide	200ppb
1,4-Oxathiane	400ppb
1,4-Dithiane	200ppb
Benzothiazole	400ppb
2-Bromothioanisole(S)	600ppb
p-chlorophenylmethylsulfide	400ppb
p-chlorophenylmethylsulfoxide	400ppb
p-chlorophenylmethylsulfone	400ppb

4. LCS's and QC's were spiked inadvertently on the average 40 times higher than the normal allowable amount provided for in the SOP. The low level LCS was spiked 50 times higher while the high LCS's and MS/MSD's were spiked 33 times higher as well. Since no analytes were detected from any of the samples, re-extraction and re-analysis of the QC was not necessary.

1B
EXPLOSIVES ANALYSIS DATA SHEET

EPA SAMPLE NO.

TDBLKA

Lab Name: GP ENVIRONMENTAL SERVICES, Contract: MONTGOM

Lab Code: GP_ENV Case No.: N/A SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) SOIL Lab Sample ID: TDBLK-032

Sample wt/vol: 10 (g/ml) G Lab File ID: P06850.D

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted:(Y/N) N Date Extracted: 05/11/98

Concentrated Extract Volume: 25000 (uL) Date Analyzed: 05/22/98

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

111-48-8	THIODIGLYCOL	500.0	U
----------	--------------	-------	---

Evaluate Continuing Calibration Report

Data File : J:\LCDATA\HPLC4\MAY2298\P06873.D
 Acq On : 22 May 98 04:45 PM
 Sample : THIO 10PPM
 Misc :
 IntFile : events.e

Vial: 25
 Operator: LF
 Inst : HPLC4
 Multiplr: 1.00

Method : J:\LCDATA\HPLC4\METHODS\THIO.M
 Title : THIO- SEVEN POINT CALIBRATION
 Last Update : Thu May 14 10:44:46 1998
 Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
 Max. RRF Dev : 25% Max. Rel. Area : 150%

Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1 T THIODIGLYCOL	23.775	26.118 E6	-9.9	98	-0.02

GP ENVIRONMENTAL SERVICES ORGANIC ANALYSIS RESULTS

GP ID: 9805040-13C
Client ID: CWMSED-02
Collected: 05/06/98
Dilution: 1

Matrix: SEDIMENT
Method: LL03 GC-FPD
Units: ug/Kg

Analyst: ABC
Analyzed: 05/20/98
Prepared: 05/11/98

GC TARGET COMPOUNDS

Parameter	Result	Rep.Lim.	Qualifier
Dimethyldisulfide	BQL	145	
1,4-Oxathiane	BQL	290	
1,4-Dithiane	BQL	145	
p-Chlorophenylmethylsulfide	BQL	290	
Benzothiazole	BQL	290	
p-Chlorophenylmethylsulfoxide	BQL	290	
p-Chlorophenylmethylsulfone	BQL	290	

GP ENVIRONMENTAL SERVICES
ORGANIC ANALYSIS RESULTSGP ID: 9805040-148
Client ID: CWMSED-03
Collected: 05/06/98
Dilution: 1Matrix: SEDIMENT
Method: LL03 GC-FPD
Units: ug/KgAnalyst: ABC
Analyzed: 05/20/98
Prepared: 05/11/98

GC TARGET COMPOUNDS

Parameter	Result	Rep.Lim.	Qualifier
Dimethyldisulfide	BQL	138	
1,4-Oxathiane	BQL	277	
1,4-Dithiane	BQL	138	
p-Chlorophenylmethysulfide	BQL	277	
Benzothiazole	BQL	277	
p-Chlorophenylmethysulfoxide	BQL	277	
p-Chlorophenylmethysulfone	BQL	277	

GP ENVIRONMENTAL SERVICES
ORGANIC ANALYSIS RESULTS

GP ID: 9805040-15B

Matrix: SEDIMENT

Analyst: ABC

Client ID: CWMSD-03-DUP

Method: LL03 GC-FPD

Analyzed: 05/20/98

Collected: 05/06/98

Units: ug/Kg

Prepared: 05/11/98

Dilution: 1

GC TARGET COMPOUNDS

Parameter	Result	Rep.Lim.	Qualifier
Dimethyldisulfide	BQL	147	
1,4-Oxathiane	BQL	295	
1,4-Dithiane	BQL	147	
p-Chlorophenylmethylsulfide	BQL	295	
Benzothiazole	BQL	295	
p-Chlorophenylmethylsulfoxide	BQL	295	
p-Chlorophenylmethylsulfone	BQL	295	

GP ENVIRONMENTAL SERVICES
ORGANIC ANALYSIS RESULTSGP ID: 9805040-01
Client ID: CWMSB-01Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Thiodiglycol	LW18	BQL	625	ug/Kg	1	05/11/98	05/22/98 LF

GP ID: 9805040-02
Client ID: CWMSB-02Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Thiodiglycol	LW18	BQL	590	ug/Kg	1	05/11/98	05/22/98 LF

GP ID: 9805040-03
Client ID: CWMSB-03Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Thiodiglycol	LW18	BQL	607	ug/Kg		05/11/98	05/22/98 LF

GP ID: 9805040-04
Client ID: CWMSB-04Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Thiodiglycol	LW18	BQL	610	ug/Kg	1	05/11/98	05/22/98 LF

GP ID: 9805040-05
Client ID: CWMSB-05Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Thiodiglycol	LW18	BQL	623	ug/Kg	1	05/11/98	05/22/98 LF

GP ID: 9805040-06
Client ID: CWMSB-06Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Thiodiglycol	LW18	BQL	600	ug/Kg	1	05/11/98	05/22/98 LF

GP ENVIRONMENTAL SERVICES
ORGANIC ANALYSIS RESULTSGP ID: 9805040-07
Client ID: CWMSB-07Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Thiodiglycol	LW18	BQL	619	ug/Kg	1	05/11/98	05/22/98 LF

GP ID: 9805040-08
Client ID: CWMSB-08Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Thiodiglycol	LW18	BQL	619	ug/Kg	1	05/11/98	05/22/98 LF

GP ID: 9805040-09
Client ID: CWMSB-09Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Thiodiglycol	LW18	BQL	591	ug/Kg	1	05/11/98	05/22/98 LF

GP ID: 9805040-10
Client ID: CWMSB-10Matrix: SOIL
Collected: 05/06/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Thiodiglycol	LW18	BQL	616	ug/Kg	1	05/11/98	05/22/98 LF

GP ID: 9805040-11
Client ID: CWMSB-10-DUPMatrix: SOIL
Collected: 05/06/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Thiodiglycol	LW18	BQL	649	ug/Kg	1	05/11/98	05/22/98 LF

GP ID: 9805040-12
Client ID: CWMSD-01Matrix: SEDIMENT
Collected: 05/06/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Thiodiglycol	LW18	BQL	758	ug/Kg	1	05/11/98	05/22/98 LF

GP ENVIRONMENTAL SERVICES
ORGANIC ANALYSIS RESULTSGP ID: 9805040-13
Client ID: CWMSD-02Matrix: SEDIMENT
Collected: 05/06/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Thiodiglycol	LW18	BQL	727	ug/Kg	1	05/11/98	05/22/98 LF

GP ID: 9805040-14
Client ID: CWMSD-03Matrix: SEDIMENT
Collected: 05/06/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Thiodiglycol	LW18	BQL	692	ug/Kg	1	05/11/98	05/22/98 LF

GP ID: 9805040-15
Client ID: CWMSD-03-DUPMatrix: SEDIMENT
Collected: 05/06/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Thiodiglycol	LW18	BQL	738	ug/Kg	1	05/11/98	05/22/98 LF

GP ENVIRONMENTAL SERVICES
WET CHEMISTRY ANALYSIS RESULTSGP ID: 9805040-01
Client ID: CWMSB-01Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Percent Solids	MCAWW 160.3	79.9		%			05/11/98 JH

GP ID: 9805040-02
Client ID: CWMSB-02Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Percent Solids	MCAWW 160.3	84.4		%			05/11/98 JH

GP ID: 9805040-03
Client ID: CWMSB-03Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Percent Solids	MCAWW 160.3	82.4		%			05/11/98 JH

GP ID: 9805040-04
Client ID: CWMSB-04Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Percent Solids	MCAWW 160.3	81.4		%			05/11/98 JH

GP ID: 9805040-05
Client ID: CWMSB-05Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Percent Solids	MCAWW 160.3	80.2		%			05/11/98 JH

GP ID: 9805040-06
Client ID: CWMSB-06Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Percent Solids	MCAWW 160.3	83.4		%			05/11/98 JH

GP ENVIRONMENTAL SERVICES
WET CHEMISTRY ANALYSIS RESULTSGP ID: 9805040-07
Client ID: CWMSB-07Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Percent Solids	MCAWW 160.3	80.8		%			05/11/98 JH

GP ID: 9805040-08
Client ID: CWMSB-08Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Percent Solids	MCAWW 160.3	80.8		%			05/11/98 JH

GP ID: 9805040-09
Client ID: CWMSB-09Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Percent Solids	MCAWW 160.3	84.6		%			05/11/98 JH

GP ID: 9805040-10
Client ID: CWMSB-10Matrix: SOIL
Collected: 05/06/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Percent Solids	MCAWW 160.3	81.1		%			05/11/98 JH

GP ID: 9805040-11
Client ID: CWMSB-10-DUPMatrix: SOIL
Collected: 05/06/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Percent Solids	MCAWW 160.3	77.0		%			05/11/98 JH

GP ID: 9805040-12
Client ID: CWMSD-01Matrix: SEDIMENT
Collected: 05/06/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Percent Solids	MCAWW 160.3	66.0		%			05/11/98 JH

GP ENVIRONMENTAL SERVICES
WET CHEMISTRY ANALYSIS RESULTSGP ID: 9805040-13
Client ID: CWMSED-02Matrix: SEDIMENT
Collected: 05/06/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Percent Solids	MCAWW 160.3	68.8		%			05/11/98 JH

GP ID: 9805040-14
Client ID: CWMSED-03Matrix: SEDIMENT
Collected: 05/06/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Percent Solids	MCAWW 160.3	72.2		%			05/11/98 JH

GP ID: 9805040-15
Client ID: CWMSED-03-DUPMatrix: SEDIMENT
Collected: 05/06/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Percent Solids	MCAWW 160.3	67.8		%			05/11/98 JH

GP ENVIRONMENTAL SERVICES
ANALYSIS RESULTSGP ID: 9805040-01
Client ID: CWMSB-01Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Mustard	GC/FPD	<.031		ug/g		05/18/98	05/18/98 DJM

GP ID: 9805040-02
Client ID: CWMSB-02Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Mustard	GC/FPD	<.028		ug/g		05/18/98	05/18/98 DJM

GP ID: 9805040-03
Client ID: CWMSB-03Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Mustard	GC/FPD	<.032		ug/g		05/18/98	05/18/98 DJM

GP ID: 9805040-04
Client ID: CWMSB-04Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Mustard	GC/FPD	<.031		ug/g		05/18/98	05/18/98 DJM

GP ID: 9805040-05
Client ID: CWMSB-05Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Mustard	GC/FPD	<.031		ug/g		05/18/98	05/18/98 DJM

GP ID: 9805040-06
Client ID: CWMSB-06Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Mustard	GC/FPD	<.028		ug/g		05/18/98	05/18/98 DJM

GP ENVIRONMENTAL SERVICES
ANALYSIS RESULTSGP ID: 9805040-07
Client ID: CWMSB-07Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Mustard	GC/FPD	<.028		ug/g		05/18/98	05/18/98 DJM

GP ID: 9805040-08
Client ID: CWMSB-08Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Mustard	GC/FPD	<.032		ug/g		05/18/98	05/18/98 DJM

GP ID: 9805040-09
Client ID: CWMSB-09Matrix: SOIL
Collected: 05/05/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Mustard	GC/FPD	<.026		ug/g		05/18/98	05/18/98 DJM

GP ID: 9805040-10
Client ID: CWMSB-10Matrix: SOIL
Collected: 05/06/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Mustard	GC/FPD	<.028		ug/g		05/18/98	05/18/98 DJM

GP ID: 9805040-12
Client ID: CWMSD-01Matrix: SEDIMENT
Collected: 05/06/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Mustard	GC/FPD	<.042		ug/g		05/18/98	05/18/98 DJM

GP ID: 9805040-13
Client ID: CWMSD-02Matrix: SEDIMENT
Collected: 05/06/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Mustard	GC/FPD	<.033		ug/g		05/18/98	05/18/98 DJM

GP ENVIRONMENTAL SERVICES
ANALYSIS RESULTSGP ID: 9805040-14
Client ID: CWMSED-03Matrix: SEDIMENT
Collected: 05/06/98

Parameter	Method	Result	Rep.Lim.	Units	Dil.	Prepared	Analyzed By
Mustard	GC/FPD	<.031		ug/g		05/18/98	05/18/98 DJM